982060

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Subject: NS - East Palestine - Train Derailment Site - Response to EPA Directive #2 - Data Management Plan April 3, 2023
Attachments: NS_DMP_FINAL_20230331.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Ralph, Jack, and Ann:

The United States Environmental Protection Agency's Site Directive #2 dated March 12, 2023 (the "Directive") requires Norfolk Southern Railway Company ("NSR") to transfer all incident environmental monitoring and sampling, well boring information, and all other georeferenced feature data for the response to the EPA, Region 5 EQuIS schema. NSR through its consultant Environmental Standards Inc. has assembled a Data Management Plan (DMP) in response to the Directive (attachment – NS DMP FINAL). The DMP is intended to provide a basis for supporting a full technical data management business cycle for environmental analytical data from pre-planning of sampling events to reporting and analysis with a particular emphasis on ensuring data completeness. NSR's data management team is available to discuss with EPA the available data and process flow of the data to the Agencies. Let me know if you have any questions or need additional information.
Regards, Marc

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Environmental Analytical Data Management Plan

East Palestine Train Derailment Site
East Palestine, Ohio

March 31, 2023

Prepared by

ENVIRONMENTAL STANDARDS, INC.
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Prepared for
Norfolk Southern Railway Company

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1.0 Introduction

The primary goal of this East Palestine Train Derailment (EPTD) Site Environmental Data Management Plan (DMP) is to address the challenges of managing analytical data from a wide array of data analysis processes. This DMP is intended to provide a basis for supporting a full technical data management business cycle for environmental analytical data from pre-planning of sampling events to reporting and analysis with a particular emphasis on ensuring data completeness, data usability, and most importantly, a high degree of data defensibility.

To support the EPTD objectives, a quality assurance project plan (QAPP) has been implemented to ensure the environmental data generated for use in decision making are of high quality and are fully documented. The project's environmental data are being used for a variety of purposes such as, but not limited to, operational decisions, ecological and human health risk assessment; delineation of the extent of contamination; and demonstration of achievement of project objectives.

The requirements of the DMP are applicable to Norfolk Southern appointed project environmental personnel, support staff, contractors, analytical laboratories, and subcontractors. QA procedures and activities, sampling designs and implementation of monitoring activities, and nomenclature for the managed analytical data associated with the EPTD is described in the investigation-specific Quality Assurance Project Plans (QAPPs) and work plans (WPs).

Certain information covered in this DMP may contain Personally Identifiable Information (PII). Private individual names, contact numbers, addresses and environmental information are considered PII. The US EPA has procedures and protections in place for the appropriate management of PII for data they receive and may distribute to others. For more information on Privacy at EPA, visit https://www.epa.gov/privacy/.

1.1 Historic and Current Data

Environmental data associated with surface water, groundwater, air, potable water, sediment, surface wipe and soil samples have been collected by Norfolk Southern or contractors on behalf of Norfolk Southern during the emergency response phase, prior to formal approval of the associated WPs and QAPPs. For this DMP, "historic" data for this project is defined as data collected under the Interim Data Management Plan by Norfolk Southern or contractors on behalf of Norfolk Southern immediately following the derailment but prior to the implementation of this DMP. Norfolk Southern will continue to conduct environmental sampling for the EPTD, resulting in the generation of a significant amount of environmental data; these data are referred to as "Current" data in this DMP.

1.2 Objectives

The main objectives for the DMP are to:

- Maintain data control, consistency, reliability, and reproducibility throughout the life cycle of the project.
- Establish the framework for consistent documentation of the quality and validity of field and laboratory data compiled during investigations.
- Describe the data management procedures for Site-related data in detail.

- Describe how new data will be integrated and comprehensively managed with historic data.
- Include procedures and timelines for sharing data with stakeholders as well as procedures for providing both electronic and Portable Document Formats (PDFs) to specified recipients of each type of data; and
- Enable the use of project data in a consistent and easily shared format among appropriate parties.

2.0 Data Management Process

This section describes the Project Team and process for managing current and historic data.

2.1 Data Elements

The data elements for this project are outlined below. There are different project requirements, including WPs and SOPs for each element. A detailed description of each data element is provided in Appendix A.

Data Elements	
Residential/Commercial/Agricultural Soil	Stationary Air
Main Line Interim Soil Removal	Analytical Air Sampling
Sediment Characterization	Surface Water
Groundwater Characterization	Forensic Wipe
Waste Characterization	Potable Water
In-Home Hand-held Air	Public Water Supply
Roaming Hand-held Air	Sentinel Wells

2.2 Project Roles

Principal project team roles are presented along with roles by data element.

2.2.1 Principal Project Personnel

Project Role	Organizational Affiliation
On-Scene Coordinator	US EPA
NSRC Coordinator	Norfolk Southern Railway Company
Project Coordinator	Project Navigator
NSRC QA Coordinator	Norfolk Southern Railway Company
Project QA Director	Environmental Standards, Inc.
QA Project Manager	Environmental Standards, Inc.
Data Validation Manager	Environmental Standards, Inc.
Environmental Data Manager	Environmental Standards, Inc.
Field Oversight Project Director	Geosyntec Consultants
Field Oversight Project Manager	Geosyntec Consultants

2.2.2 Residential/Commercial/Agricultural Soil, Main Line Interim Soil Removal Soil, Sediment, Groundwater, and Waste Characterization

Data Element	Project Role	Organizational Affiliation

• Residential, Commercial, Agricultural Soil • Main Line Interim Soil Removal • Sediment Characterization • Groundwater Characterization • Waste Characterization	Sampling Contractor Project Manager	Arcadis
	Field Sampling Personnel	Arcadis
	Field Team Leader	Arcadis
	Laboratory Project Manager	Eurofins Environment Testing North Central, LLC.
	Laboratory QA Manager	Eurofins Environment Testing North Central, LLC.

2.2.3 In-Home Hand-held Air, Stationary Air, Air Sampling, Surface Water, and Surface Wipe

Data Element	Project Role	Organizational Affiliation
• In-Home Hand-held Air • Stationary Air • Analytical Air Samples • Surface Water • Roaming Hand-Held Air • Forensic Wipe Samples	Sampling Contractor Project Manager	CTEH, LLC.
	Field Sampling Personnel	CTEH, LLC.
	Field Team Leader	CTEH, LLC.
	Laboratory Project Manager	Pace Analytical LLC., SGS Galson, RJ Lee
	Laboratory QA Manager	Pace Analytical LLC., SGS Galson, RJ Lee

2.2.4 Potable Water, Public Water, and Sentinel Well

Data Element	Project Role	Organizational Affiliation
• Potable Water • Public Water • Sentinel Well	Sampling Contractor Project Manager	Stantec
	Field Sampling Personnel	Stantec
	Field Team Leader	Stantec
	Laboratory Project Manager	Eurofins Environment Testing North Central, LLC.
	Laboratory QA Manager	Eurofins Environment Testing North Central, LLC.

2.3 Project Responsibilities

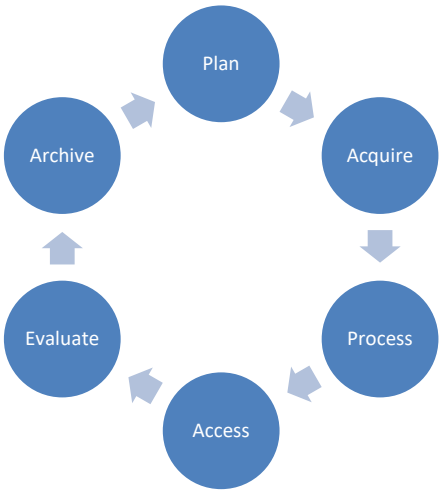
Project Role	Responsibilities
On-Scene Coordinator	The US EPA OSCs for US EPA Region 5 and US EPA Region 3 are responsible for overseeing NSRC's implementation of the UAO. OSCs have the authority to halt, conduct, or direct any work required by the UAO or to direct any other response action if the OSC(s) determine conditions at the site to constitute an emergency or to present a threat to public health or welfare or to the environment. The OSCs are responsible for reviewing and approving project documents and plans. The OSCs may designate an RPM and assign similar decision-making authority. The absence of one or both OSCs from the site will not be cause for stopping or delaying the work.
NSRC Coordinator	The NRSC Coordinators are responsible for ensuring the directives from the OSCs are carried out. The NSRC Coordinators are responsible for contracting with and providing direction to the sampling contractors, analytical laboratories, and QA consultants.
Project Coordinator	The Project Coordinator holds responsibility for administration of the work required by the UAO. All communications between US EPA and NSRC, and all documents concerning activities pursuant to the UAO shall be directed to the Project Coordinator. The Project Coordinator will serve as the primary interface with US EPA and other regulatory agencies and will direct the work of NSRC and its contractors under the UAO. The Project Coordinator is responsible for ensuring the requirements set forth in the UAO are met. The Project Coordinator will be present on Site or readily available during the work required by the UAO
NSRC QA Coordinator	The NSRC QA Coordinator is responsible for ensuring the quality assurance directives from the OSC's are carried out. The NSRC QA Coordinator is responsible for contracting with and providing direction to QA Consultants related to all data elements.
Project QA Director	The Project QA Director is responsible for developing, implementing, administering, and monitoring compliance with the project QA program as defined in this QAPP. The Project QA Director holds overall authority for the project QA and maintains that authority independently from the operational/production aspects of the project. The Project QA Director prepares the QAPP; initiates and directs internal observations of quality-related activities; directs the performance of QA functions described in this QAPP; requests corrective action for nonconformances; and ensures corrective actions are effective. The Project QA Director also acts as an advisor in coordinating laboratory analytical work and may act as a liaison between Field Team Leaders and analytical laboratories. The Project QA Director is responsible for communicating issues related to environmental data quality to the project team.
QA Project Manager	The QA Project Manager is responsible for coordinating QA activities under the direction of the Project QA Director.

Project Role	Responsibilities
Data Validation Manager	The Data Validation Manager is responsible for ensuring analytical data are evaluated for completeness, correctness, compliance, and usability relative to the requirements in the QAPP, the UAO, and the published analytical methods. The Data Validation Manager is responsible for scheduling, tracking, and providing data status updates to project data users. The Data Validation Manager is responsible for reviewing and submitting data validation reports and for communicating data usability issues to data users. The Data Validation Manager is responsible for notifying the Project QA Director of potential analytical issues observed during data validation for investigation and corrective action where warranted.
Environmental Data Managers	The Environmental Data Managers are responsible for managing the project databases, which include field- and laboratory-generated analytical data and associated metadata. The Environmental Data Managers are the main point-of-contact for data-related issues and data reporting needs. The Environmental Data Managers are responsible for ensuring compliance with the QAPP. The Environmental Data Managers oversee receipt and loading of electronic data deliverables from the field sampling personnel and project laboratories; coordinates production data validation efforts with the Data Validation Manager; defines valid values and similar controls for the database; and coordinates delivery of data to regulatory agencies and data users. The Environmental Data Managers are responsible for communicating data status and potential data management issues.
Field Oversight Project Directors	The Field Oversight Project Director is independent from field sampling activities and works with the Field Team Leaders to ensure compliance with the QAPP and approved project plans. The Field Oversight Project Director is responsible for coordinating and conducting performance audits of field activities during sample collection to assess the procedures and performance of the Field Sampling Personnel relative to the project requirements.
Field Oversight Project Managers	The Field Oversight PM is responsible for coordinating field oversight activities under the direction of the Field Oversight Project Director.
Sampling Contractor Project Managers	The Contractor PMs are responsible for planning, coordinating, and overseeing all aspects of performance of UAO activities assigned to their organization by the Project Coordinator. The Contractor PMs are responsible for ensuring that all work is conducted in accordance with this QAPP, the UAO, and associated approved project documents or plans. The Contractor Project Managers develop project plans for submittal to the Project Coordinator and OSCs; coordinate resources and schedule project activities associated with approved plans; review and interpret information generated from activities assigned to their organization; and prepare reports to the Project Coordinator and OSCs.
Field Sampling Personnel	Field Sampling Personnel are responsible for the performance of field activities as required by the QAPP, FSPs, and/or WPs. Field Sampling Personnel document compliance with project requirements by recording field activities and observations in a field logbook at the

Project Role	Responsibilities
	time of the activity or observation. In addition, Field Sampling Personnel are responsible for collecting samples, submitting them to laboratories, and maintaining COC Records.
Field Team Leader	The Field Team Leaders plan, schedule, coordinate, and oversee field sampling activities. The Field Team Leaders reviews field documentation to verify compliance with associated approved project plans, including the QAPP and FSP. The Field Team Leaders are the primary contacts in the field and are responsible for communicating issues identified during field activities.
Laboratory Project Manager	The Laboratory PMs are the primary point of contact for the project team at the analytical laboratory. The Laboratory PMs are responsible for reviewing project plans and communicating requirements to laboratory personnel; receiving analytical requests; identifying laboratory facilities with appropriate capacity and capability (including certification, where required) to analyze samples collected under this UAO. Laboratory PMs are responsible for scheduling bottleware orders; communicating issues observed upon sample receipt; tracking and communicating data reporting status; and reviewing and submitting deliverables.
Laboratory QA Manager	The Laboratory QA Managers ensure analytical work is conducted in accordance with this QAPP, referenced analytical methods, and the laboratory quality system. The Laboratory QA Managers are responsible for reviewing analytical data; investigating and responding to data inquiries; conducting corrective action investigations for nonconformances; preparing status reports and reports documenting completion of corrective actions; and overall administration of the laboratory QA program. The Laboratory QA Managers are responsible for reviewing the QAPP and associated project plans to confirm QC requirements are met

2.4 Management of Current Data

Optimal control of data is enforced by rigorous pre-planning of sampling activities and related analytical requirements. The data management lifecycle presented below shows the approach of managing the flow of project data from planning to archival, with a goal of data security, data integrity, and data availability.

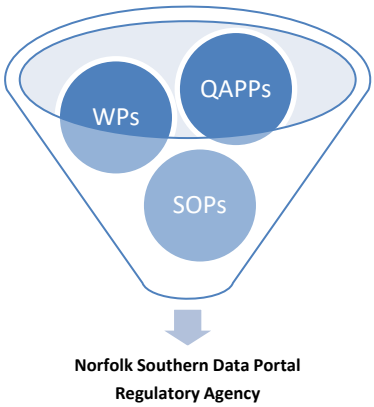


Each step of the lifecycle is detailed below. Appendix B outlines the data workflow by data element.

2.4.1 Planning

The data management process starts during investigation planning. This planning phase gives consideration for appropriate levels of documentation specific to the individual data collection process and details any event-related data. Planning documents include WPs, QAPPs, and Standard Operating Procedures (SOPs). These documents act as guidelines for the configuration of any electronic data storage systems implemented for the project.

All planning documents require client and regulatory approval and are uploaded to the Norfolk Southern Data Portal, categorized by investigation.



2.4.2 Acquisition

Data are continuously being generated by multiple users and in multiple forms. Each data element contains multiple data streams and require equal attention. Each section below details these data streams and how the data are acquired.

2.4.2.1 Field Observations

Field observation requirements vary by data element and are detailed in investigation-specific WPs. Field observations data may include notes, logs, calibrations, photos, and monitoring/measurement information. Field observations can be both structured (quantitative, standardized, and well-defined) and unstructured (no predefined data model, human generated, or text based). Structured field observations including monitoring and measurement information will be stored in project databases, while unstructured data, including logbooks and photos, will be uploaded to the Norfolk Southern Data Portal, categorized by investigation.

Appendix B shows how field observation data are stored by data element.

Any structured field observation data associated with sample collection (Sample Collection section below) will be delivered to the Environmental Data Manager, by the Sampling Contractor Project Manager, in the Field EDD Specification in Appendix C, within 24 hours of observation.

Structured field observation data associated with sample collection will be immediately loaded to the laboratory analysis database. (Details of the database are described in later sections.)

2.4.2.2 Geospatial Data

Geospatial data, or geodata, is data that includes information related to locations on the Earth's surface. Each data elements use of geospatial data includes the use of ArcGIS. Appendix A provides details for each data element, Appendix B shows the workflow for each data element, and the Data Access section outlines how data are "pushed" and "pulled" from each system.

2.4.2.3 Sample Collection

The requirements for the collection of samples for laboratory analysis are dictated by investigation-specific WPs and SOPs. When sample collection is dictated, a Chain-of-Custody (COC), created by Field Sampling Personnel, is required. The COC will serve as a legal document for sample handling and transfer. COC requirements include unique sample nomenclature (specified in the WPs), collection dates/times, sample locations, laboratory assignment, sample shipment information, container and preservation details, sampler contact information, laboratory turn-around-time (TAT), relinquished dates/times, and requested analytical tests. Hardcopy COCs should be sent with the samples to the Laboratory Project Manager.

PDF versions of completed COCs will be provided to the Data Validation Manager and the Environmental Data Manager, or their designee(s), within 24 hours of sample collection.

Additionally, sample collection information must be delivered to the Environmental Data Manager, or their designee(s), in the Field EDD Specification in Appendix C within 24 hours of sample collection.

Appendix D contains a workflow outlining roles and processes from sample collection to sample receipt.

2.4.2.4 Sample Receipt

Within 24 hours of receipt of the samples, the Laboratory Project Manager will send the sample receipt acknowledgement to the Data Validation Manager and the Environmental Data Manager indicating the sample identification numbers and the analyses to be conducted on each sample. The Data Validation Manager or their designee(s) will review the acknowledgement and confirm that no errors have been made, based on individual sampling plans/WPs/QAPPs. If errors are detected, the Data Validation Manager will communicate with the laboratory to resolve the issue.

A Sample receipt confirmation (SRC) must include:

- Sample receipt quantities and condition of containers (such as broken/leaking, temperature, hold time, custody maintained)
- Sample preparation (such as compositing and filtration) and analyses to be conducted
- Date that analyses will be completed and
- Laboratory sample IDs and SDG (Sample Delivery Group) number

With the sample receipt acknowledgment, the Environmental Data Manager or their designee(s) will initiate a database record that will start the data tracking process. Each event related to laboratory analyzed data, including its associated field data, will be tracked by the Environmental Data Manager, or their designee(s). Appendix E lists all tracked activities.

Appendix D contains a workflow outlining roles and processes from sample collection to sample receipt.

2.4.2.1 Laboratory Analysis

Laboratory personnel analyze the samples as specified on the COC and according to the published method and project-specific requirements in the WPs/QAPPs.

Within the TAT listed on the COC, the Laboratory Project Manager will deliver a Level 2 PDF report and an Electronic Data Deliverable (EDD) of completed analysis to the Data Validation Manager and the Environmental Data Manager or their designees.

Appendix F contains Level 2 deliverables requirements and Appendix G contains Laboratory EDD deliverables requirements.

A portion of the laboratory analyzed data will require a Level 4 deliverable. The Data Validation Manager or their designee will select a subset of data for this requirement. The Laboratory

Project Manager will deliver a Level 4 PDF report to the Data Validation Manager and the Environmental Data Manager. The requirements for the Level 4 data deliverable can be found in Appendix H

2.4.1 Process

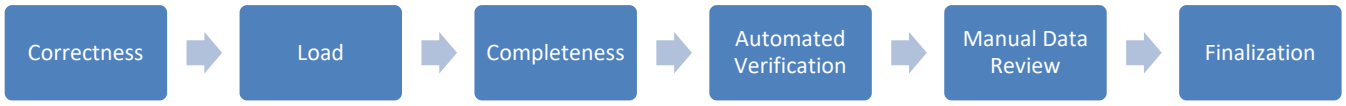
Data processing includes the checking, loading, comparing, updating, and finalizing of laboratory analyzed and associated field observation data. Each section below details the procedures by which data is processed.

2.4.1.1 Laboratory Analysis Data Review

All laboratory analysis data undergoes the Data Review process. If additional Level 4 deliverables are requested, only additional manual review is performed. Laboratory analysis data review contains both manual and automated components. Automated components are performed by the Environmental Data Manager, or their designee, while manual components are performed by the Data Validation Manager, or their designee.

Manual components of laboratory analysis data review can be found in the investigation-specific QAPPs.

The laboratory analysis data review process below shows the manual and automated procedures used to ensure data quality and usability.



Each step of the process is detailed below and presented in Appendix I with associated data revision loops.

Software used to complete the automated data review process can be found in later sections.

Correctness

Data Correctness checks are used to determine if data are loadable to the laboratory analytical result database. Correctness checks focus on format, appropriate reference value usage, and parent-child relationship tests. The laboratory reported EDD is uploaded to a staging area where the data quality and integrity tests are performed. Checks include:

- Required fields and values
- Field Lengths
- Data Types

- Valid Dates/Times
- Reference Values
- Duplicate Rows
- Relationships

Load

Only data passing Correctness checks are loaded to the laboratory analytical result database. Data loading moves data from the Completeness staging area to the database staging area and finally, to the database.

Movement to the database staging area ensures that the laboratory EDD will move successfully into the database structure.

Following a successful move to the database staging area, the data are uploaded to the database.

Completeness

Completeness is performed following data load and is a series of comparisons against both the imported Field Observation data (see Field Observations section) and project defined method analyte groups (MAGs).

Comparison to Field Observations Data

Uploaded Field Observations Data contains, in part, details regarding sample collection that can be used to ensure the accurate and complete reporting by the analytical laboratory. Comparisons between Field Observations Data and Laboratory Analysis Data include:

- Sample Name
- Sample Date/Time
- Sample Type
- Analytical Method

Comparisons are multi-directional and provide exceptions between both field and laboratory are noted. For Example, not only will a missing sample in laboratory analytical data be noted, but a missing sample in field observations data will be noted.

Comparison to Method Analyte Groups (MAGs)

During the planning phase of project setup, a list of approved Method Analyte Groups (MAGs) will be established. MAGs detail a list of specific reported analytical methods and their corresponding analytes. Additionally, appropriate analyte reporting properties are defined. Completeness compares the laboratory analysis data to defined MAGs and details any exceptions found. MAGs Completeness checks include:

- Analytical Method
- CAS Numbers
- Total/Dissolved Fields
- Units

Automated Verification

Automated Verification assesses loaded, correct, and complete data against project-specific QC limits and assigns data flags. No data that produced exceptions in the Completeness, Load, or Correctness phases is eligible for Automated Verification. The chart below outlines Automated Verification checks and definitions. All checks compare project limits to:

Check	**Definition**
Accuracy	Reported recoveries for matrix spike and blank spike samples
Precision	Reported or calculated relative percent differences between Matrix Spike/Matrix Spike Duplicate, Field Duplicate/Parent, Blank Spike/Blank Spike Duplicate, Laboratory Duplicate/Parent
Blank Contamination	Reported or calculated adjusted results in Field and Lab Blanks
Holding Times	Calculated differences between sample collection, extraction, leachate, and analytes
Surrogate	Reported recoveries for surrogate analyses
Percent Moisture/Solid	Reported percent moisture or percent solid results

Manual Data Review

Following automated data review, manual data review begins. Manual data review is performed by Analytical Chemists supporting the Data Validation Manager. To support manual data review, the Environmental Data Manager provides the Data Validation Manager with deliverables of Correct, Loaded, Complete, and Automatically Verified laboratory analytical data in the following formats.

- Excel export
- PDF tabulated data table
- PDF Verification Summary

The Data Validation Manager performs the components manual data review in accordance with investigation-specific QAPPs.

Any updates to data based on findings of the manual data review, including data review flags and reason codes, are provided as updates to the Excel exports. Exports are imported to a staging area, by the Environmental Data Manager, where they are linked with the laboratory analytical database records. Only matching “key” fields are updated based on manual data review. Any updates to “key” fields are performed manually. “Key” fields are:

- Sample ID
- Analytic Method
- Total/Dissolved
- Analysis Date/Time
- Column Number
- Test Type

Following updates, the same deliverables outlined above are provided to the Data Validation Manager. The Data Validation Manager will confirm the updates in the newly provided data. The cycle of updates continues until all updates are complete and correct, at which point the data moves on to Finalization.

Finalization

The Finalization step is the assigning of status flags to the laboratory analytical data both in the result and tracking databases.

All data is set to a status of "Stage 2a" during the Finalization step. If the laboratory analyzed data was selected for a Stage 3 validation (see Laboratory Analysis) by the Data Validation Manager, following the completion of the manual data review of the Level 4 laboratory report, the data will be set to a status of "Stage 3".

Data in the laboratory analytical database with a "Null" status flag has not been finalized.

2.4.2 Access

Data Access is the ability to use and share data across organizations and platforms. As detailed by the workflows in Appendix B, each data element may have different access requirements and specifications. Some access will require the "pushing" of data, while others will require the "pulling" of data.

While access to data is imperative, ensuring authorized data access is essential. Norfolk Southern will maintain a list of authorized users on the Norfolk Southern Data Portal. This list will show 1.) Organizational Affiliation 2.) Project Role 3.) Project Contact 5.) Contact Information 4.) Allowable Data Access by Data Element or by Data storage system.

Note that the EPA requires that all data, authorized for release by Norfolk Southern, should include the following e-mail address, in addition to possible individual stakeholders.

- R5_OPS@epa.gov
- R5_PSC@epa.gov
- R5_ENVL@epa.gov
- R5_SITL@epa.gov
- R5_Data@epa.gov
- R5_DOCL@epa.gov

It should be noted that some data streams include PII, which will be shared with parties following the authorized release of data. The US EPA has procedures and protections in place for the appropriate management of PII for data they receive and may distribute to others. See https://www.epa.gov/privacy/.

Appendix J shows an example Authorized Users List.

The sections below outline data access requirements.

2.4.2.1 Laboratory Analysis

The following data elements require laboratory analysis and may require Data Review: Residential/Commercial/Agricultural Soil, Main Line Interim Soil Removal Soil, Sediment, Groundwater, Waste Characterization, Analytical Air Sampling, Surface Water, Surface Wipe, Potable Water, Public Water, and Sentinel Well

Data Type	Push/Pull	From	To
Field Observations (unstructured)	Push	Sampling Contractor Project Manager	Norfolk Southern Data Portal
Field Observations (structured	Push	Sampling Contractor Project Manager	Environmental Data Manager
Geospatial Data	Pull	Sampling Contractor Project Manager	EPA ArcGIS
Sample Collection	Push	Field Sampling Personnel	Environmental Data Manager Data Validation Manager
Laboratory Analysis	Push	Laboratory Project Manager	Environmental Data Manager Data Validation Manager Norfolk Southern Data Portal
Laboratory Analysis Data Review	Push	Data Validation Manager	Norfolk Southern Data Portal
Laboratory Analysis Data Review	Push	Environmental Data Manager	EPA R5 Database
Laboratory Analysis Data Review	Pull	Environmental Data Manager	Sampling Contractor Project Manager

2.4.2.2 – Non-Laboratory Analysis

The following data elements do not require laboratory analysis or Data Review: In-Home Hand-held Air, Stationary Air

Data Type	Push/Pull	From	To
Field Observations (unstructured)	Push	Sampling Contractor Project Manager	Norfolk Southern Data Portal
Field Observations (structured)	Push and Pull	Sampling Contractor Project Manager	Stationary air monitoring data to EPA VIPER. In-home air data not currently provided.
Geospatial Data	Pull	Sampling Contractor Project Manager	EPA ArcGIS

2.4.3 Evaluate

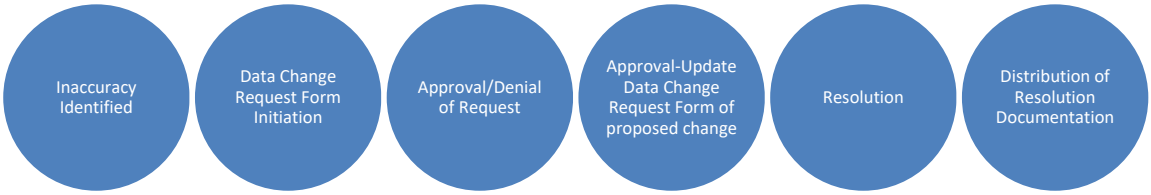
Each Project Role and Organization Affiliation has different data evaluation criteria. Additionally, each set of acquired data has different evaluation criteria, even by the same Project Role or Organization Affiliation. The common denominator is to ensure the accuracy, reliability, and integrity of data collected and stored.

The storage systems of data are also evaluated and optimized for appropriate data security, access, safety, retention, and storage capabilities.

As data is reviewed and evaluated, inaccuracies may be discovered. Below is the process for communicating, assessing, and correcting identified data inaccuracies.

2.4.3.1 Data Changes

The following steps are performed when data inaccuracies are discovered.



The Data Change Request Form can be found in Appendix K.

2.4.4 Archive

Like data evaluation, the varied data sources have different data archival expectations and requirements.

The table below outlines data acquisition and process elements and data archival information:

Data Type	Affiliation	System	Backup Frequency	Retention Time
Field Observations(structured)	Stantec	Stantec and NS Sharepoint Sites	Daily – field forms with notes and water quality parameters are reviewed, scanned and uploaded to shared data sites.	Indefinite
	Arcadis	FieldNow®	FieldNow® standard applications are created in Fulcrum, ArcGIS Field Maps, and ArcGIS Survey123. These applications can be accessed from any mobile device (phone or tablet, personal or company, Android, or iOS). The Fulcrum database is backed up near-real time.	Indefinite
	CTEH, LLC.	CTEH SQL Database	Full – 24 Hours	30 Days
Field Observations (unstructured)	Stantec	Stantec and NS SharePoint Sites	Daily – photos are reviewed and selected for upload to shared data sites	Indefinite
	Arcadis	Paper Documents	Photos of field forms and COCs are photographed using a mobile application and submitted to the Arcadis SharePoint site. In addition, once the data have been reviewed QC'd the data is uploaded to the NS portal.	Indefinite
	CTEH, LLC.	Paper Documents	Photos of field forms and COCs are photographed using CTEH mobile application and submitted to the CTEH database. Originals will be filed by date in a file folder or other suitable container.	Indefinite
Geospatial	Stantec	ArcGIS	Geospatial data is being added to archived private well sampling	Indefinite

			locations and stored on Stantec's GIS database. Field sampling data is backed up bi-weekly for updating and verifying locations. Stantec is working to automate synchronization to daily events.	
	Arcadis	ArcGIS	Geospatial data is stored on Arcadis Enterprise database/server, shared via Enterprise/AGO data services and/or geodatabase delivery. Nightly regular backup to all database features and files.	Indefinite
	CTEH, LLC.	ArcGIS	Any geospatial data not contained in the CTEH SQL database is synced with SharePoint via OneDrive as file are created or modified.	Indefinite
Sample Collection Sample Receipt Laboratory Analysis	*Various Commercial Laboratories. Contact Laboratories listed in individual SAP's for further detail.*			
Laboratory Analysis Data Review - Automated	Environmental Standards, Inc.	EQuIS Custom SQL Modules	Full - 24 hours Incremental Transaction – 15 minutes	Full – Daily – 30 Days Full – Weekly – 2 Months Full – Monthly - Indefinitely
Laboratory Analysis Data Review – Manual	Environmental Standards, Inc.	SharePoint	Full - 24 hours Incremental Transaction – 15 minutes	Full – Daily – 30 Days Full – Weekly – 2 Months Full – Monthly - Indefinitely

2.5 Management of Historic Data

Environmental data associated with surface water, groundwater, air, potable water, sediment, and soil samples have been collected by Norfolk Southern or contractors on behalf of Norfolk Southern during the emergency response phase, prior to formal approval of the associated WPs and QAPPs. For this DMP, “historic” data on this project is defined as data collected under the Interim Data Management Plan by Norfolk Southern or contractors on behalf of Norfolk Southern immediately following the derailment but prior to the implementation of this DMP.

While some current data will continue to follow the streams and systems established during the historic period, some historic data will be migrated to a new system used for current data.

Notes on migration are supplied below, but detailed migration documents, outlining updates to valid values, data types, and data mapping will be provided 30 days following data migration and will be added as appendices to the DMP.

The table below outlines where current and historic data will be maintained in the same system and where it will be migrated.

Data Type	Affiliation	Historic System	Current System	Notes
Field Observations(structured) – Associated with Laboratory Analysis	Stantec	EQuIS	EQuIS	Exports of historic data will be delivered to the Environmental Data Manager for migration into the current System. New data will be sent on a daily frequency in the approved format.
	Arcadis	EQuIS	EQuIS	
	CTEH, LLC.	CTEH SQL database	EQuIS	
Field Observations(structured) – Not associated with Laboratory Analysis	Stantec	Scanned to SharePoint	No Change	
	Arcadis	Fielding®	Fielding®	
	CTEH, LLC.	CTEH SQL database	CTEH SQL database and EQuIS	CTEH water quality parameters will be imported into EQuIS.
Field Observations (unstructured)	Stantec	Scanned to Sharepoint	No Change	
	Arcadis	Photos of field forms and COCs are photographed using a mobile application and submitted to the Arcadis SharePoint site. In addition, once the data have been reviewed QC'd the data is uploaded to the NS portal.	No change	
	CTEH, LLC.	CTEH SQL database and suitable file container.	CTEH SQL database and suitable file container.	
Geospatial	Stantec	ArcGIS	ArcGIS	
	Arcadis	ArcGIS	ArcGIS	

	CTEH, LLC.	CTEH SQL database and ArcGIS	EQuIS and ArcGIS	Spatial data related to sampling will be exported to EQuIS.
Sample Collection Sample Receipt Laboratory Analysis	*Various Commercial Laboratories. Contact Laboratories listed in individual SAP's for further detail.*			
Laboratory Analysis Data Review - Automated	Environmental Standards, Inc.	Custom SQL Database	EQuIS	Historic data will be migrated into the Current System. New data will be sent on a daily frequency in the approved format.
Laboratory Analysis Data Review – Manual	Environmental Standards, Inc.	SharePoint	SharePoint	

3.0 Data Storage and Analysis System Overview

Data types and Organization affiliation use different systems to store and analyze data. Below is an outline of system descriptions and specifications.

3.1 Planning Data

3.1.1 Document Creation

Planning data, including SOPs, WPs, and QAPPs are created using word processing software (Microsoft Word). Documents are finalized using Adobe Acrobat to create PDF files.

3.1.2 Norfolk Southern Data Portal

Finalized planning documents are uploaded to the Norfolk Southern Data Portal. This portal is a SharePoint based document repository. SharePoint is a browser-based collaboration and document management platform developed by Microsoft. Appendix L outlines the Norfolk Southern Data Portal.

3.2 Field Observations-Structured

3.2.1 FieldNow

Arcadis' Data Automation and collection service using software to evaluate, analyze and collect service data.

3.2.2 CTEH Mobile Application

CTEH utilizes Mobile Data Studio forms to electronically capture data related to environmental monitoring and sampling. This includes, but is not limited to, location, time, air monitoring concentrations, and sample types.

3.2.3 Honeywell Safety Suite

Honeywell Safety Suite is utilized to record and observe air monitoring observations from air monitoring equipment such as Honeywell AreaRAEs and MultiRAEs.

3.2.4 Dräger X-PID Mobile Application

The Dräger X-PID mobile application interfaces with the Dräger X-PID to configure the instrument, initiate sampling, and record air monitoring observations.

3.3 Field Observations-Unstructured

Unstructured Field Observations are handwritten documents and forms.

CTEH field forms and COCs are photographed using CTEH mobile application and submitted to the CTEH database. Original field forms will be filed by date in a file folder or other suitable container. The original COC is sent with its associated samples to the contracted laboratory where it is scanned and provided as an attachment to the final laboratory report. For in-home air assessments the original field form is provided to the property owner or their representative.

Arcadis unstructured field forms and COCs are photographed using a mobile application and submitted to the Arcadis SharePoint site. In addition, once the data have been reviewed QC'd the data is uploaded to the NS portal.

Stantec field forms and photos are reviewed daily for quality control, scanned and saved to Stantec's data server, and uploaded to the NS share site.

3.4 Geospatial Data

3.4.1 ArcGIS

ArcGIS is a geospatial software to view, edit, manage, and analyze geographic data, developed by ESRI.

3.5 Sample Collection

Sample Collection is documented using hand-written forms. Any data collected will require manual entry into the Field EDD Specification in Appendix C.

3.6 Sample Receipt

Laboratories initiate sample tracking in their internal Laboratory Information Management System (LIMS) to provide documentation of sample receipt and conformance or variance from sampling and analysis requirements. Documentation of these findings are tracked in the LIMS, with exports and summaries provided to all relevant parties upon sample receipt.

3.7 Laboratory Analysis

Laboratory analysis is performed in internal LIMS systems at individual analytical laboratories. Exports from the LIMS of all relevant data are provided in L2, L4 and EDD deliverables.

3.8 Laboratory Analysis Data Review – Manual

Manual Laboratory Analysis Data Review documents are stored and maintained in a SharePoint based document repository. SharePoint is a browser-based collaboration and document management platform developed by Microsoft. Appendix L outlines the Norfolk Southern Data Portal.

3.9 Laboratory Analysis Data Review – Automated

3.9.1 EQuIS

EQuIS is an environmental data management system developed by EarthSoft. EQuIS consists of a suite of applications, both desktop and web based. Automated Laboratory Analysis Data Review does not use all modules available in EQuIS. The modules used are listed below.

3.9.1.1 Electronic Data Processor (EDP)

The electronic data processor (EDP) functionally enables loading of Electronic Data Deliverables (EDDs), testing against project and database specifications, including reference values, required fields, formatting, and logic rules.

Reference Values for the EPTD are those provided by the EPA Region 5 EDP EDD Import Specification. Documentation on EPA Region 5 import specification is available here: https://www.epa.gov/superfund/region-5-superfund-electronic-data-submission-documents

3.9.1.2 EQuIS Professional

EQuIS Professional provides the administrative capabilities of the EQuIS data management schema. This application provides tools for the management of Reference Values, Import Formats, User security, and Schema access.

3.9.1.3 EQuIS Enterprise

Enterprise is a web-based portal for visualization and generating pre-defined reports on demand. Users may run reports with defined parameters selected and save those settings for future use.

3.9.2 Custom SQL Modules

All Custom Modules are built and maintained in a SQL Server/Microsoft application environment. Environmental Standards' Modules link to the EQuIS database to provide added functionality for status tracking and data evaluation.

3.9.2.1 Status Tracking Module

All deliverable and data task objectives are tracked by in the Status Tracking Module. Tracking, review, revision, and significant trigger points associated with data are entered into the system including, but not limited to laboratory sample receipt, laboratory data package receipt, laboratory EDD receipt, data loading stages, QA review phases, data finalization, and any export/communication of finalized data. The Status Tracking Module allows for the creation of deliverable tracking reports and interfaces and documents the assignment and completion of tasks through the cumulative data review and approval process.

3.9.2.2 Completeness Processor

The Completeness Processor assesses EDDs that have been successfully loaded via EQuIS EDP. The processor inspects the data for confirmation of receipt of each requested sample, appropriate requested analytical methods, and correct requested target analytes for each analytical method.

3.9.2.3 Data Verification Module

The Data Verification Module quantitatively assesses loaded, correct, and complete data against project-specific QC limits for accuracy, precision, blank contamination, holding times, and exceedances against project-defined limit lists. This functionality supports the project goals

by automating a significant amount of manual effort in the quantitative assessment of analytical data.

3.9.2.4 Review Module

The Review Module provides an interface to:

- Create Data Tables
- Create Data Exports
- Perform Manual Data Updates based on Manual Laboratory Analysis Data Review.
- Perform Post Validation Checks to ensure reasonable and accurate updates have been made during data validation.
- Import validated files to update validation qualifications and reason codes.

4.0 Upload to EPA Region 5 EQuIS Database

Finalization of data according to the Quality Assurance Project Plan triggers the data to be exported from the NS EQuIS database. Upon approval of the final QA Report and the upload of documentation to the NS Data Portal, data transfer EDDs will be generated from the NS EQuIS Database and checked for errors in EDP. The data will be uploaded to the Region 5 EQuIS Database according to the specifications documented here: https://www.epa.gov/superfund/region-5-superfund-electronic-data-submission-documents

5.0 References

- EPTD Quality Assurance Project Plan (EPTD QAPP)
- EPTD Work Plans
- EPA Region 5 Electronic Data Submission Documentation: https://www.epa.gov/superfund/region-5-superfund-electronic-data-submission-documents

APPENDICES

Appendix A - Data Element Table

Data Element	What organization collected the information?	Is an electronic form of that information currently available? If so, provide brief description of data storage system and data format. If not, explain.	Can the information be provided in a web-based data service and made immediately available to EPA? If not, explain.	Contact information for the NSR representative and the contractor representative capable of coordinating data sharing.	Will the format or system for data management of this information change as NSR rolls out longer-term solutions (for example, uploading to the R5 Environmental Quality Information System ("EQuIS")? If so, describe the change to take place and the anticipated timing for that change.
Air monitoring locations, stationary	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website. Custom formats can be produced but may require further planning.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
Air monitoring data, stationary	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of daily summaries are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website. Custom formats can be produced but may require further planning.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.

Air monitoring locations, roving	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. PDF copies of lab reports and daily summaries are currently available on the NS SharePoint site. This data is also available on the CTEH project website. Custom formats can be produced but may require further planning.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
Air monitoring data, roving	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. PDF copies of lab reports and daily summaries are currently available on the NS SharePoint site. This data is also available on the CTEH project website. Custom formats can be produced but may require further planning.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.

Air sampling, locations	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of locations and daily summaries are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. Custom formats can be produced but may require further planning. This data is also available on the CTEH project website.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
Air sampling, data	CTEH / Pace	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of lab reports and daily summaries are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website. Custom formats can be produced but may require further planning.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.

In-home Air Assessments, locations	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of inspection reports are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
In-home Air Assessment, data	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of inspection reports are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
In-home Air Assessment call-logs and notes.	CTEH	Data is stored in an internally developed call intake and ticketing application and database.	Data can be accessed through the web by CSV or Excel download. An API is also available for programmatic data access.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.

Surface water sample, locations	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of daily summaries are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
Surface water sample, data	CTEH / Pace	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of lab reports and daily summaries are currently available on the NS SharePoint site. This data is also available on the CTEH project website.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.

Potable well sample locations with associated well boring data and field sampling information	AECOM / Stantec Field forms Arcadis well boring data	Potable well field sampling forms and well boring logs (pdf) are available on Stantec NS SharePoint. Locations (static shared) and shapefile in works (KG)	This information can be provided as a pdf on a SharePoint site. Recently generated data with geo-spatial reference can be provided in ESRI Web service.	Tom Cole, Stantec Thomas.Cole@Stantec.com 517-712-7969	The final format will be outlined in the final data management plan.
Potable well sample, sample analysis data	Stantec / Eurofins	Laboratory Final Data Packages are uploaded to the Norfolk Southern SharePoint Site, as well as the Stantec NS SharePoint Site. Validated Laboratory EDDs are available on the Stantec NS SharePoint Site and have been uploaded into the Stantec EQuiS database currently housing validated laboratory results (both AECOM and Stantec).	Validated Potable well analytical data is available from Stantec's EQuIS database. PDF versions of the Final Laboratory Data Package are available on both NS and Stantec NS SharePoint AECOM validated data was transferred into an EQUIS database and the final laboratory data packages are on the NS SharePoint and the Stantec NS SharePoint.	Brigid Zvirbulis, Stantec Brigid.zvirbulis@stantec.com 248-522-8304 for fixed laboratory data Carole Lieu, Stantec Carole.Lieu@stantec.com 226-929-7875 for EQuiS database information	The final format will be outlined in the final data management plan.

All other well locations NSR is managing data for, including but not limited to: (1) existing and proposed monitoring wells; (2) sentinel monitoring wells; and (3) municipal groundwater wells	Stantec	Laboratory Final Data Packages are uploaded to the Norfolk Southern SharePoint Site, as well as the Stantec NS SharePoint Site. Validated Laboratory EDDs are available on the Stantec NS SharePoint Site and have been uploaded into the Stantec EQuiS database currently housing validated laboratory results (both AECOM and Stantec). Stantec Could share figures (pdf) of proposed SMW locations, well construction logs, development logs, purge logs; shapefile for municipal/sentinel; waiting on shapefile for private; pdf sampling logs for municipal wells.	Validated Potable well analytical data is available from Stantec's EQuIS database. PDF versions of the Final Laboratory Data Package are available on both NS and Stantec NS SharePoint	Michael Hutchinson, Stantec Michael.hutchinson@stantec.com 770-846-8716 Brigid Zvirbulis Stantec, Brigid.zvirbulis@stantec.com 248-522-8304 for fixed laboratory data Carole Lieu, Stantec Carole.Lieu@stantec.com 226-929-7875 for EQuiS database information Tom Cole, Stantec Thomas.Cole@Stantec.com 517-712-7969	The final format will be outlined in the final data management plan.

All other well locations NSR is managing data for, including but not limited to: (1) existing and proposed monitoring wells;	ARCADIS	Yes, NS data portal for work plans and associated maps and ArcGIS Pro (internal to Arcadis)	Feature service (line, point, and polygon) can be provided through AGO online for Arcadis online web maps	Dennis Capria Dennis.capria@arcadis.com 315-751-1672 Carolyn Grogan Carolyn.grogan@arcadis.com 614-271-6586	The final format will be outlined in the final data management plan.
Sampling and analysis data from all other well locations	ARCADIS / Eurofins	Yes, tablet data collection and EQuIS database for analytical data (internal to Arcadis)	No – QA/QC required prior to publishing on NS data portal	Dennis Capria Dennis.capria@arcadis.com 315-751-1672 Carolyn Grogan Carolyn.grogan@arcadis.com 614-271-6586	The final format will be outlined in the final data management plan.
Surface water monitoring, locations	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of daily summaries are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.

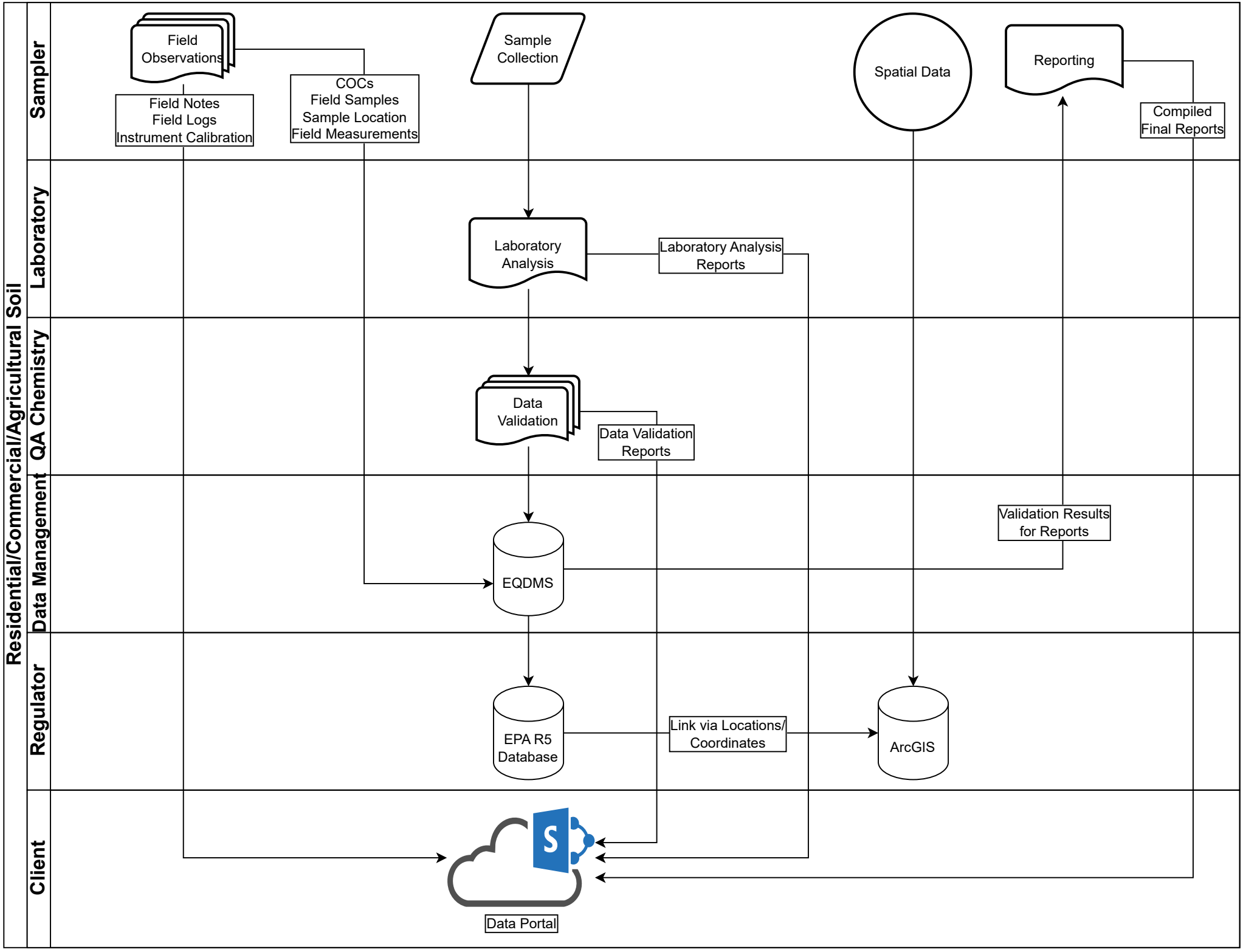
Surface water monitoring, data	CTEH	Data is stored in a PostgreSQL database with a CTEH specific schema. It can be exported to the format outlined in the final data management plan. PDF copies of lab reports and daily summaries are currently available on the NS SharePoint site.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. This data is also available on the CTEH project website.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
Sediment Sampling, locations	ARCADIS	Yes, NS data portal for work plans and associated maps and ArcGIS Pro (internal to Arcadis)	Feature service (line, point, and polygon) can be provided through AGO online for Arcadis online web maps	Dennis Capria Dennis.capria@arcadis.com 315-751-1672 Carolyn Grogan Carolyn.grogan@arcadis.com 614-271-6586	The final format will be outlined in the final data management plan.
Sediment Sampling, data	ARCADIS	Yes, EQuIS database for analytical data (internal to Arcadis)	No – QA/QC required prior to publishing on NS data portal	Dennis Capria Dennis.capria@arcadis.com 315-751-1672 Carolyn Grogan Carolyn.grogan@arcadis.com 614-271-6586	The final format will be outlined in the final data management plan.

All other georeferenced features NSR has collected or managed as part of the response. This includes but is not limited to: (1) point / line / area features depicting operational areas of interest; (2) excavational areas; (3) personnel and equipment staging areas; (4) waste staging and transfer areas; (5) drainage and surface water features, including dams and underflow dams; (5) hard and soft boom areas; (6) material product recovery areas (7) surface water sparging and (8) any other mitigation or engineering control location not already covered	ARCADIS	Yes, NS data portal for work plans and associated maps	ArcGIS Pro (internal to Arcadis). Feature service (line, point, and polygon) can be provided through AGO online for Arcadis online web maps.	Arcadis – Carolyn Grogan and Dennis Capria	The final format will be outlined in the final data management plan.
Unmanned Aerial Systems (UAS) collected data	ARCADIS	Yes, available via the USEPA SharePoint	Yes, already implemented	Arcadis – Carolyn Grogan and Dennis Capria	The final format will be outlined in the final data management plan.

Phase I – Residential, Commercial, Agricultural Soil Sampling Workplan, locations	ARCADIS	Yes, NS data portal for work plans and associated maps and ArcGIS Pro (internal to Arcadis)	Feature service (line, point, and polygon) can be provided through AGO online for Arcadis online web maps	Arcadis – Carolyn Grogan and Dennis Capria	The final format will be outlined in the final data management plan.
Phase I – Residential, Commercial, Agricultural Soil Sampling Workplan, data	ARCADIS / Eurofins	Yes, NS data portal for inspection reports, plans and associated maps. Laboratory reports will also be available on SharePoint as they come in.	No – QA/QC required prior to publishing on NS data portal. Yes, EQuIS database for analytical data (internal to Arcadis)	Arcadis – Carolyn Grogan and Dennis Capria	The final format will be outlined in the final data management plan.
Confirmation Soil Sampling, locations	ARCADIS	Yes, NS data portal for work plans and associated maps.	ArcGIS Pro (internal to Arcadis). Feature service (line, point, and polygon) can be provided through AGO online for Arcadis online web maps.	Arcadis – Carolyn Grogan and Dennis Capria	The final format will be outlined in the final data management plan.
Confirmation Soil Sampling, data	ARCADIS / Eurofins	Yes, NS data portal for work plans and associated maps. PDF Laboratory reports are available on the NS SharePoint.	Yes, EQuIS database for analytical data (internal to Arcadis) No – QA/QC required prior to publishing on NS data portal	Arcadis – Carolyn Grogan and Dennis Capria	The final format will be outlined in the final data management plan.

Site Photos	CTEH	Not currently.	Yes. The data can be provided as an ESRI REST service for consumption by ArcGIS online, etc. Photos for air monitoring, sampling, and site observations are stored in a file server file system. Meta data such as descriptions and coordinates are stored in a PostgreSQL database with a CTEH specific schema.	Eric Callahan ecallahan@cteh.com 501-366-1525	The final format will be outlined in the approved data management plan.
Site photos	Stantec / AECOM	Not currently.	Photos are geo referenced and/or labeled with location IDs.	Tom Cole, Stantec Thomas.Cole@Stantec.com 517-712-7969	The final format will be outlined in the final data management plan.
All metadata for all geodata	CTEH / Arcadis / Stantec	Dependent on corresponding data.	TBD	NA	
Any fate and transport or groundwater flow models	NA				
Any other georeferenced data NS is managing for the response	TBD				

Appendix B - Data Element Workflows



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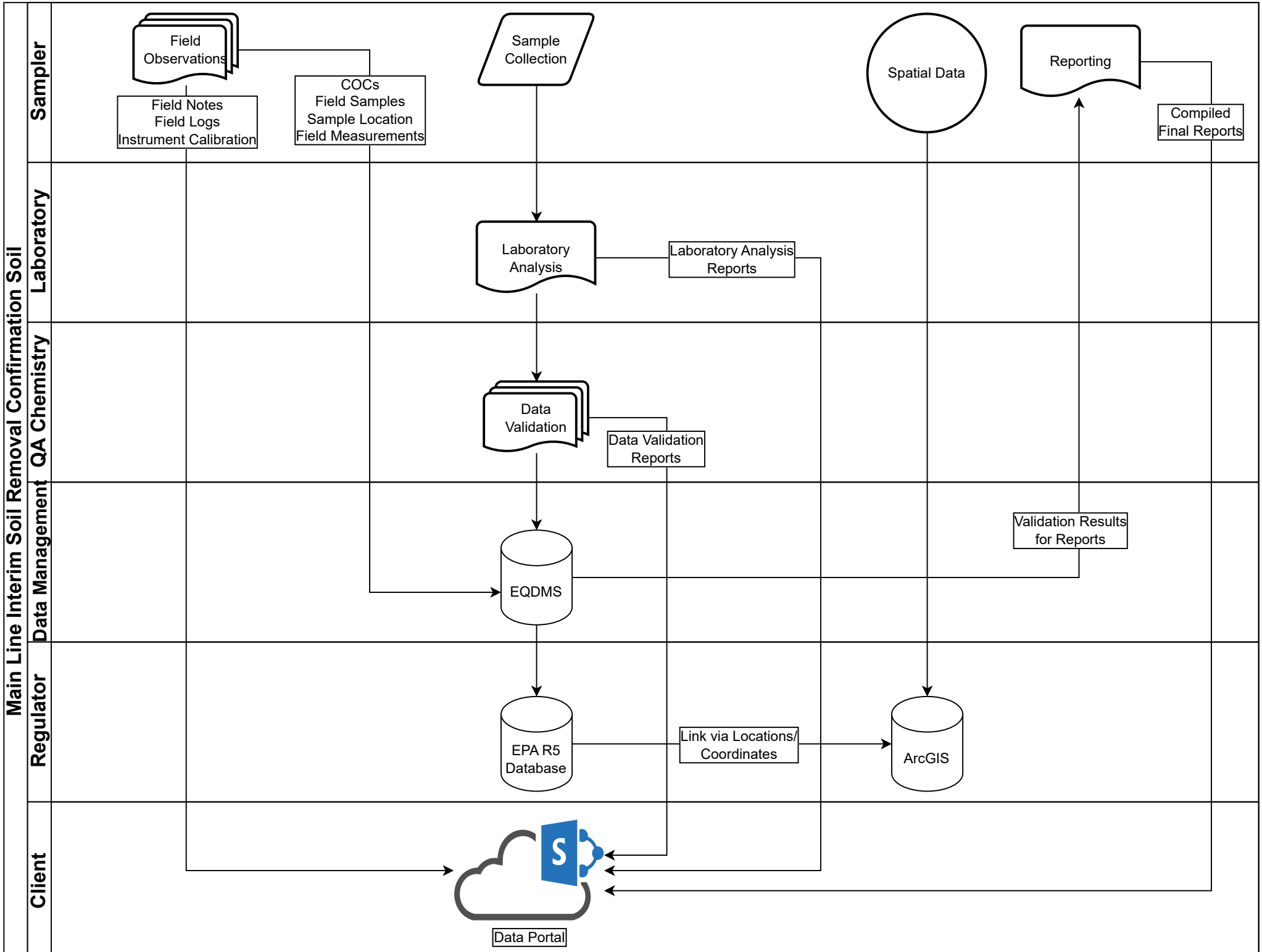

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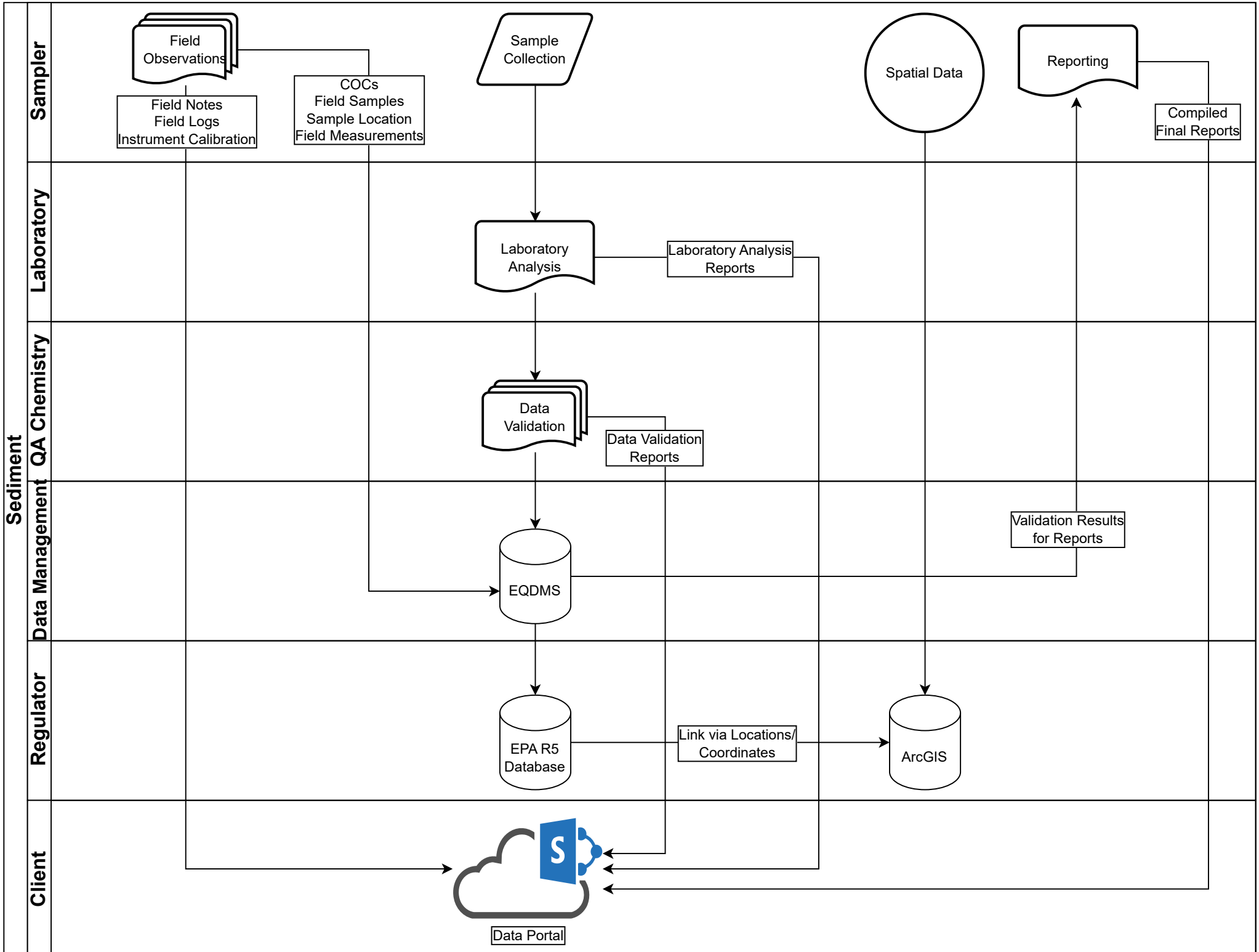

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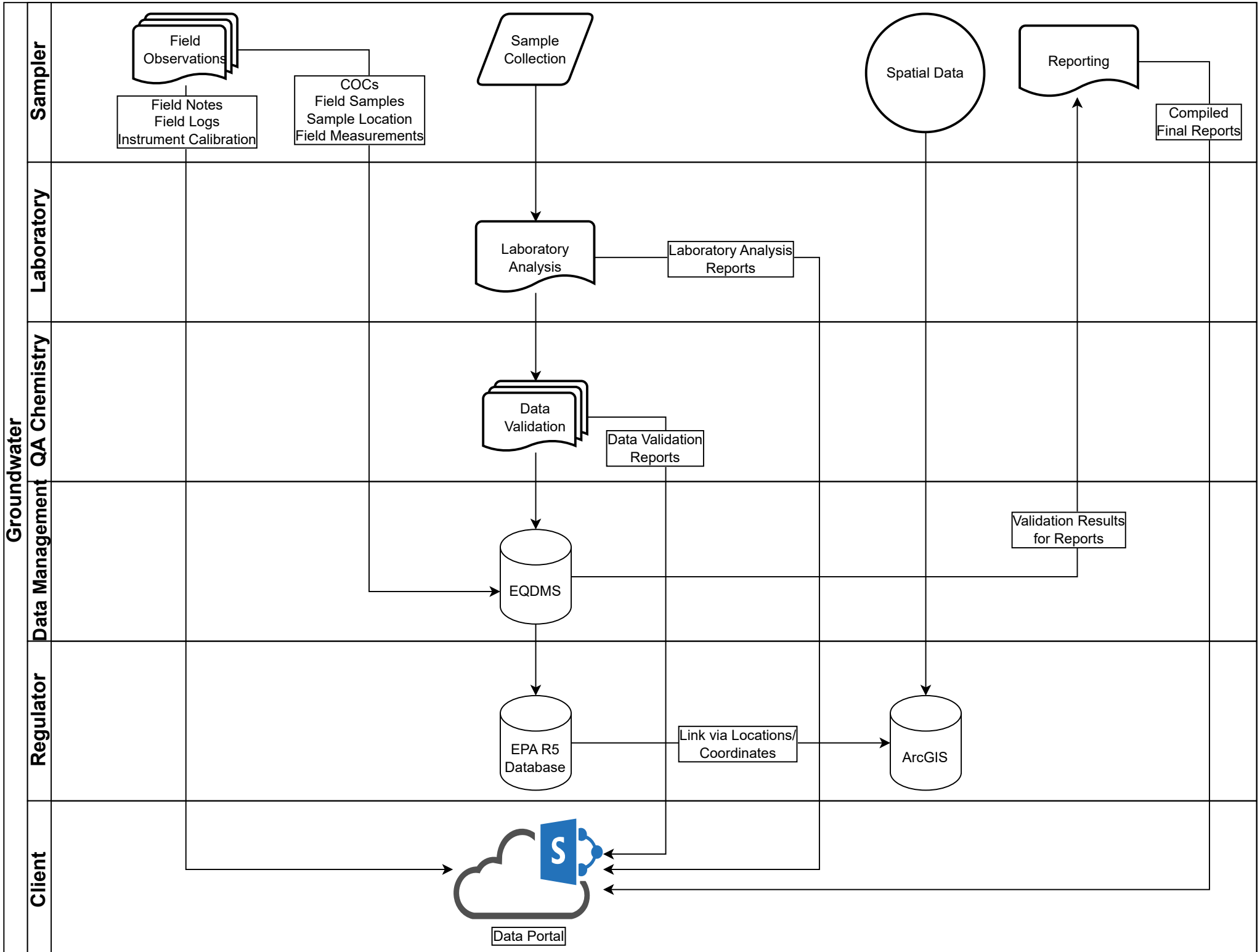

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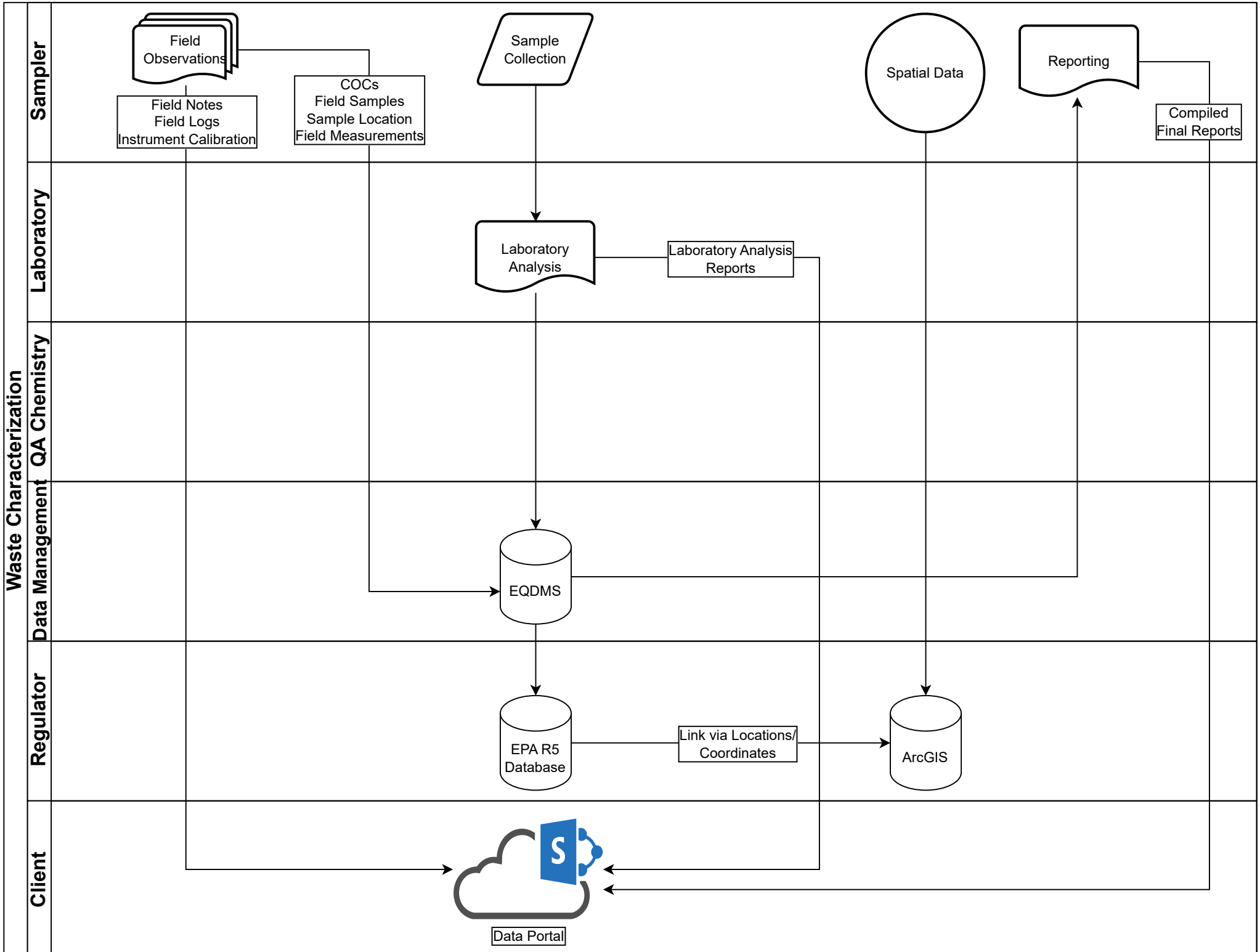

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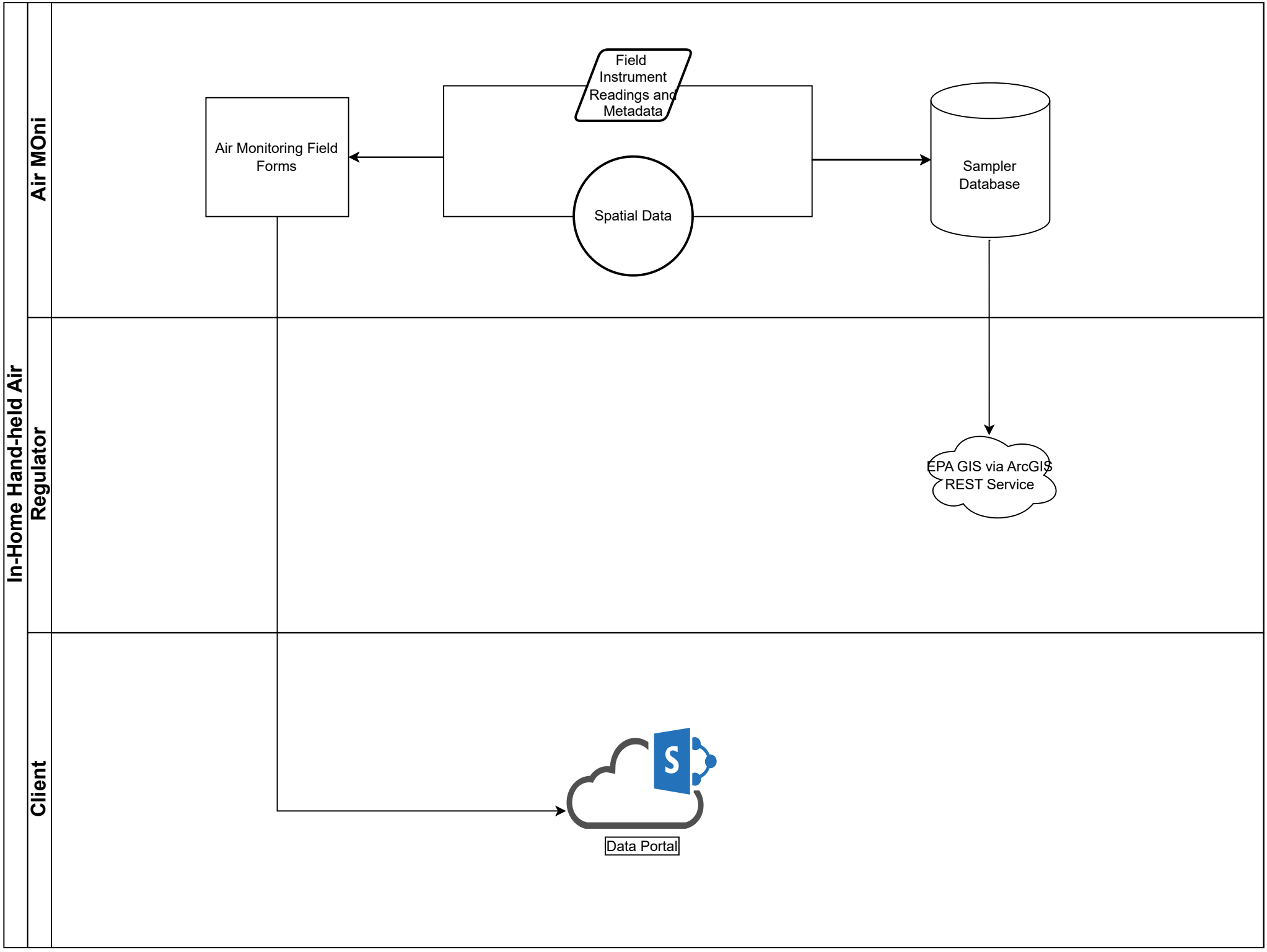

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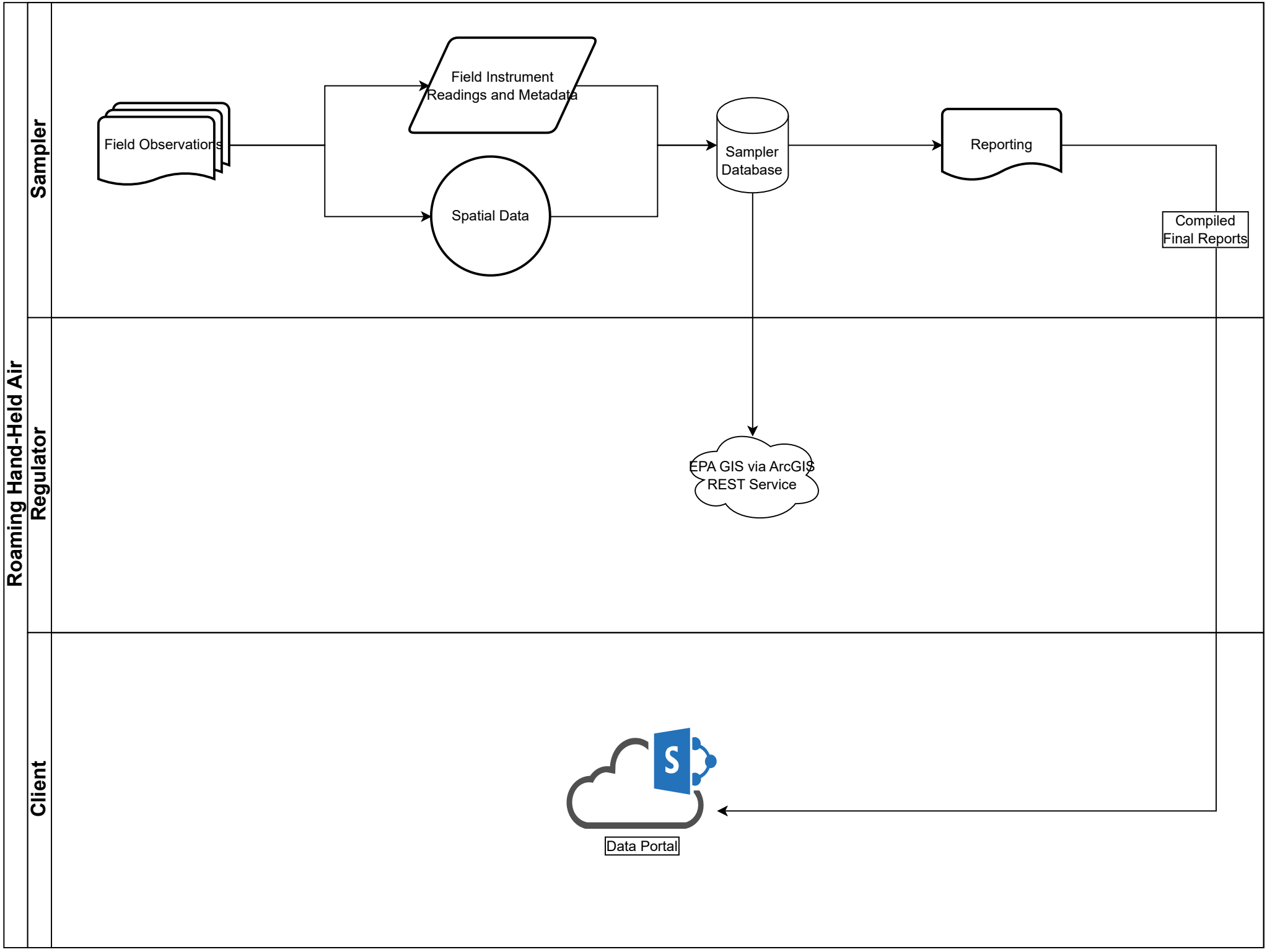

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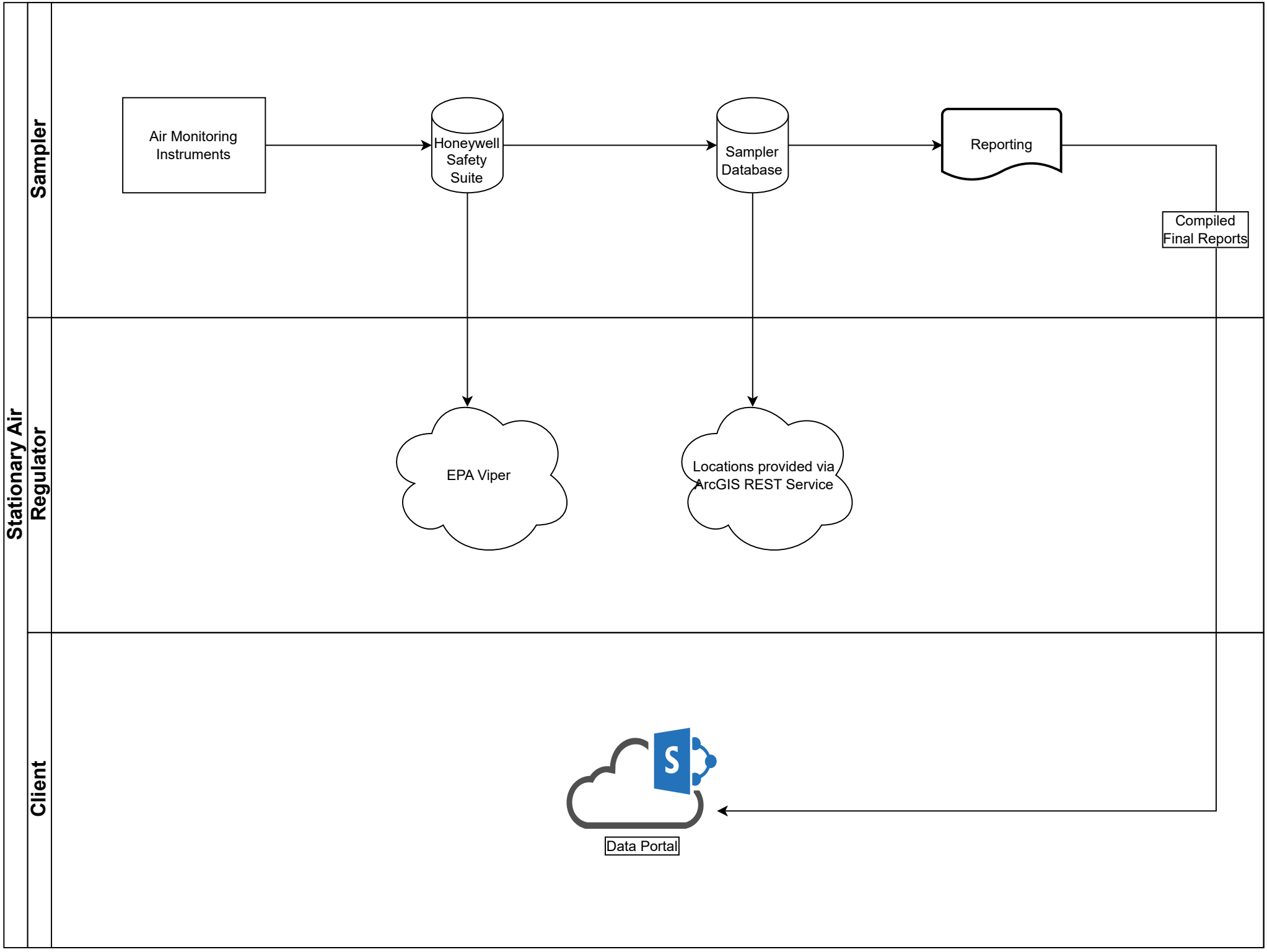

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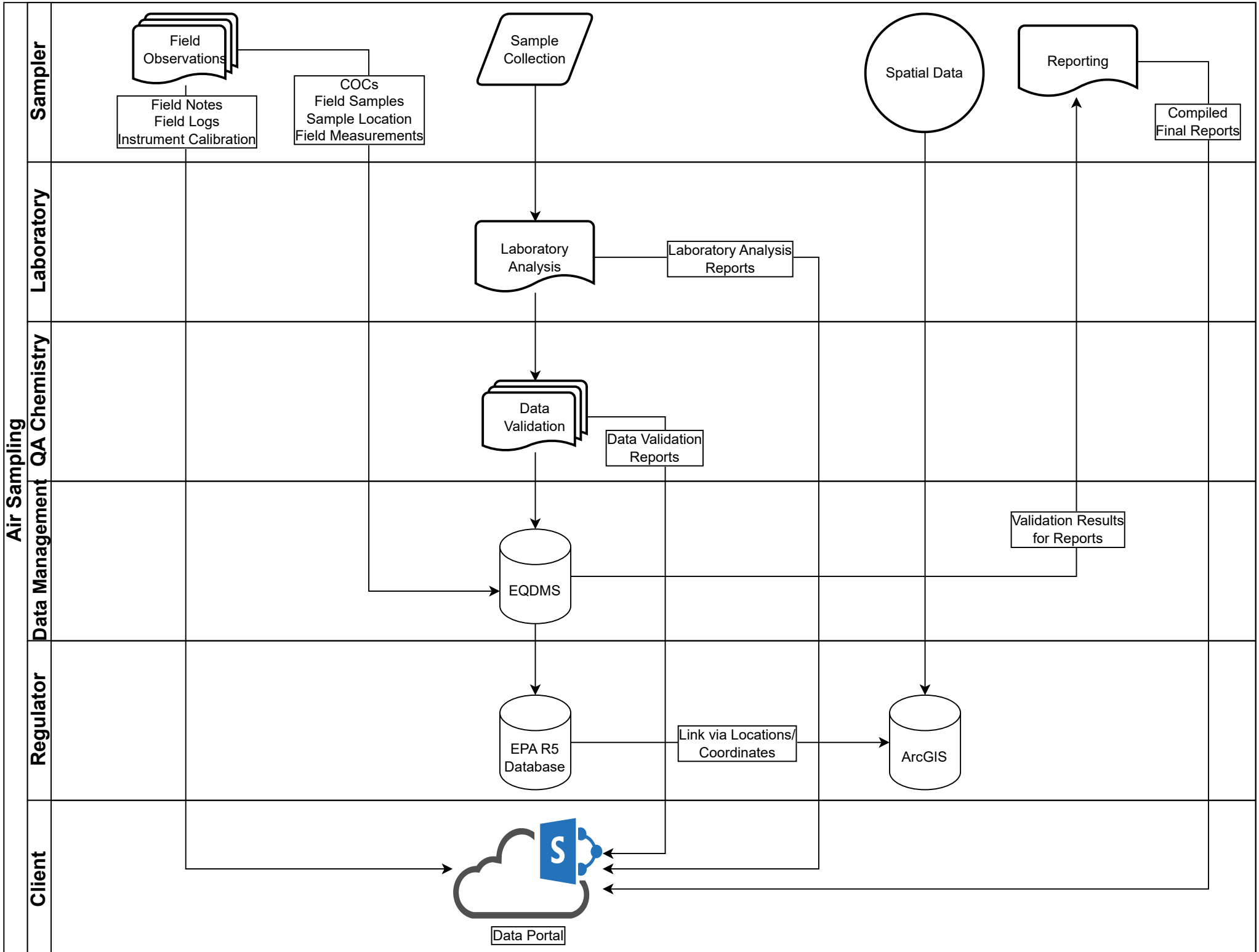

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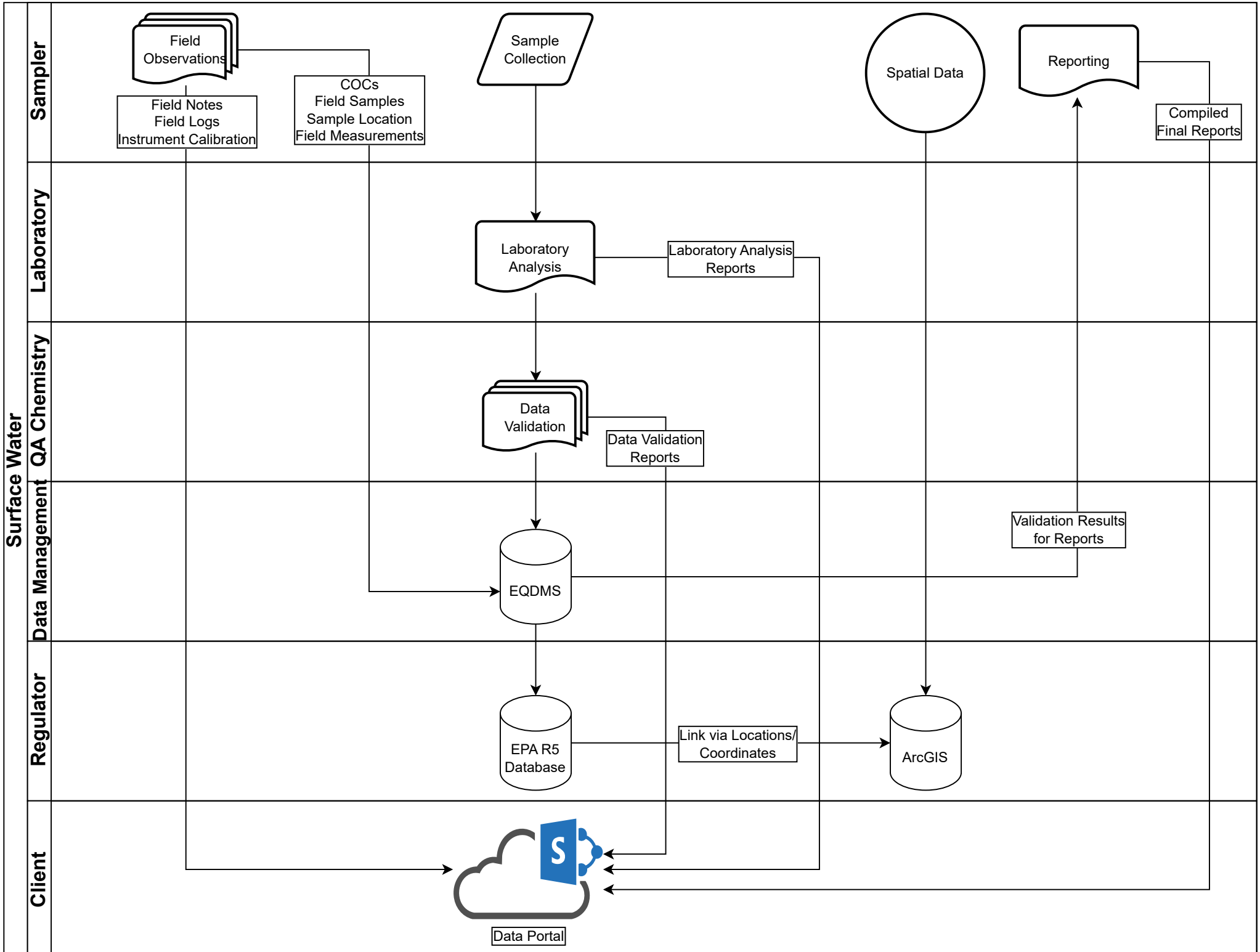

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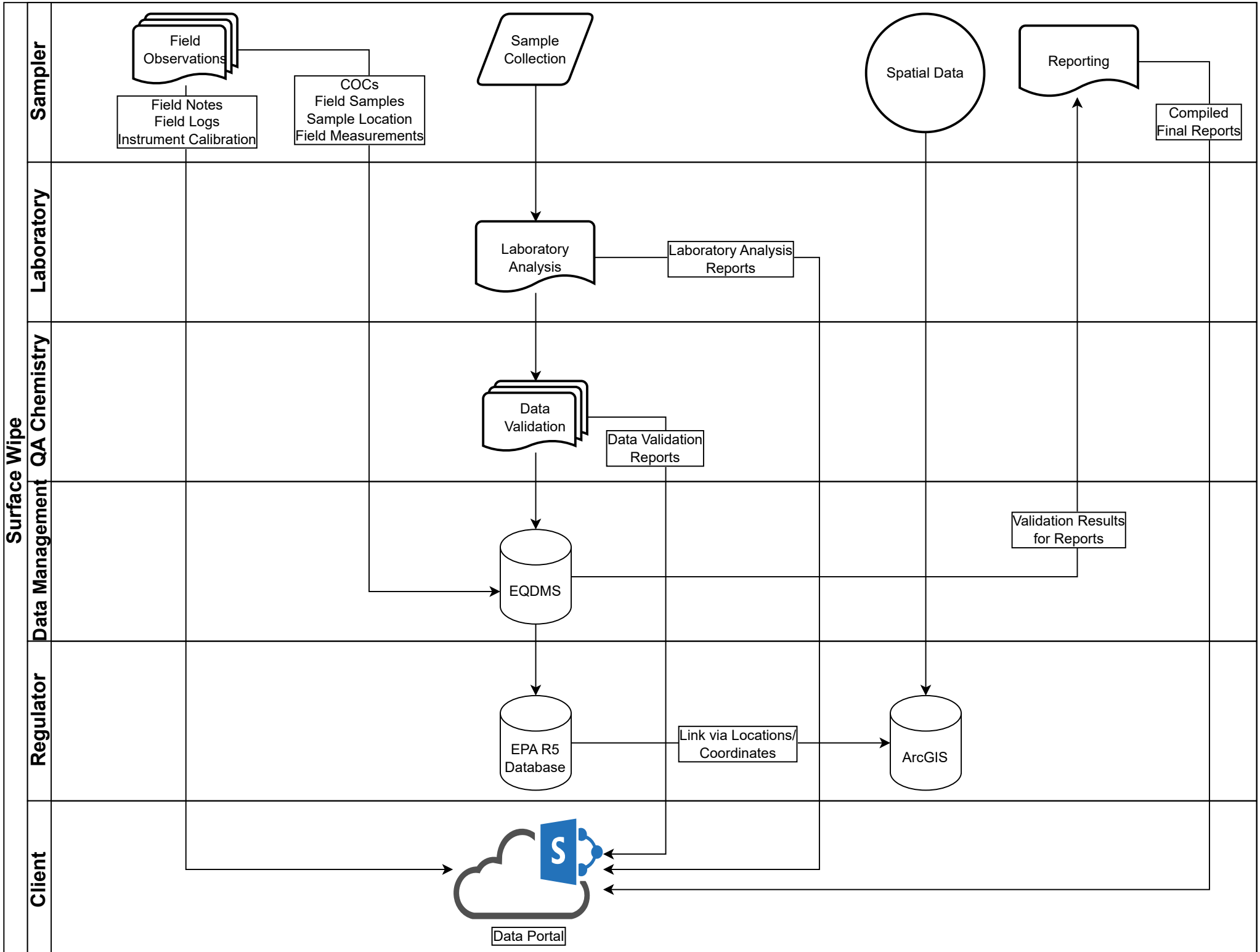

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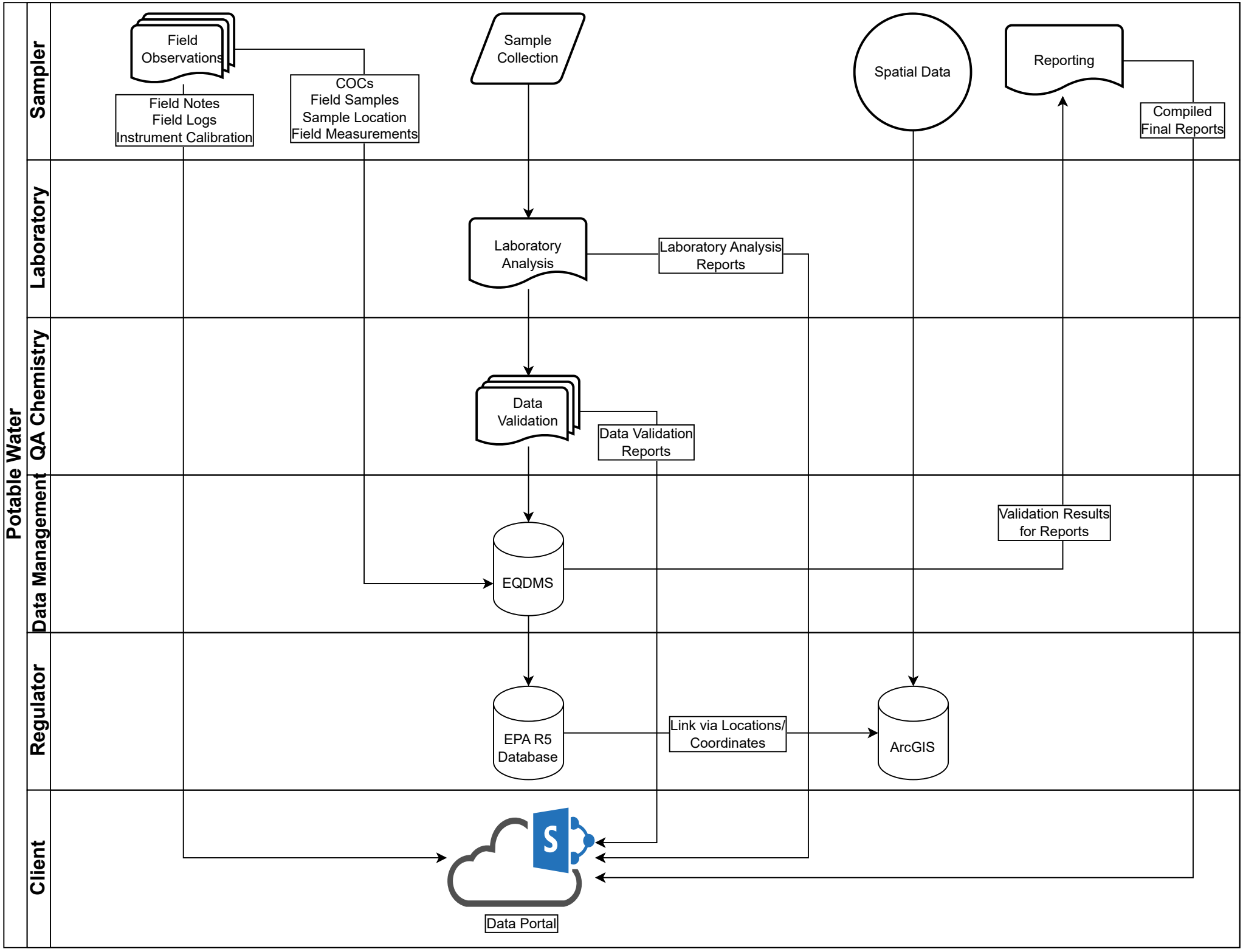

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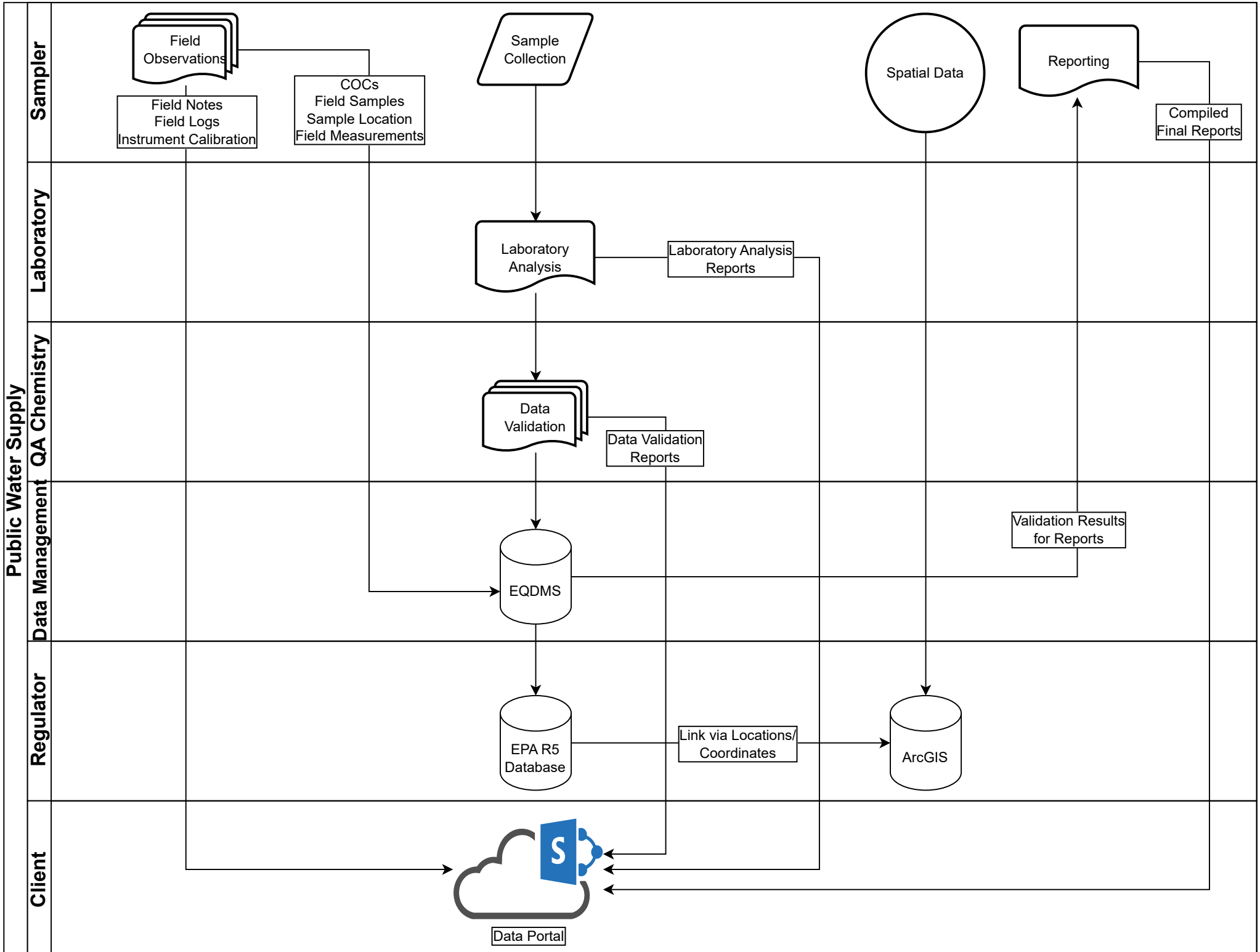

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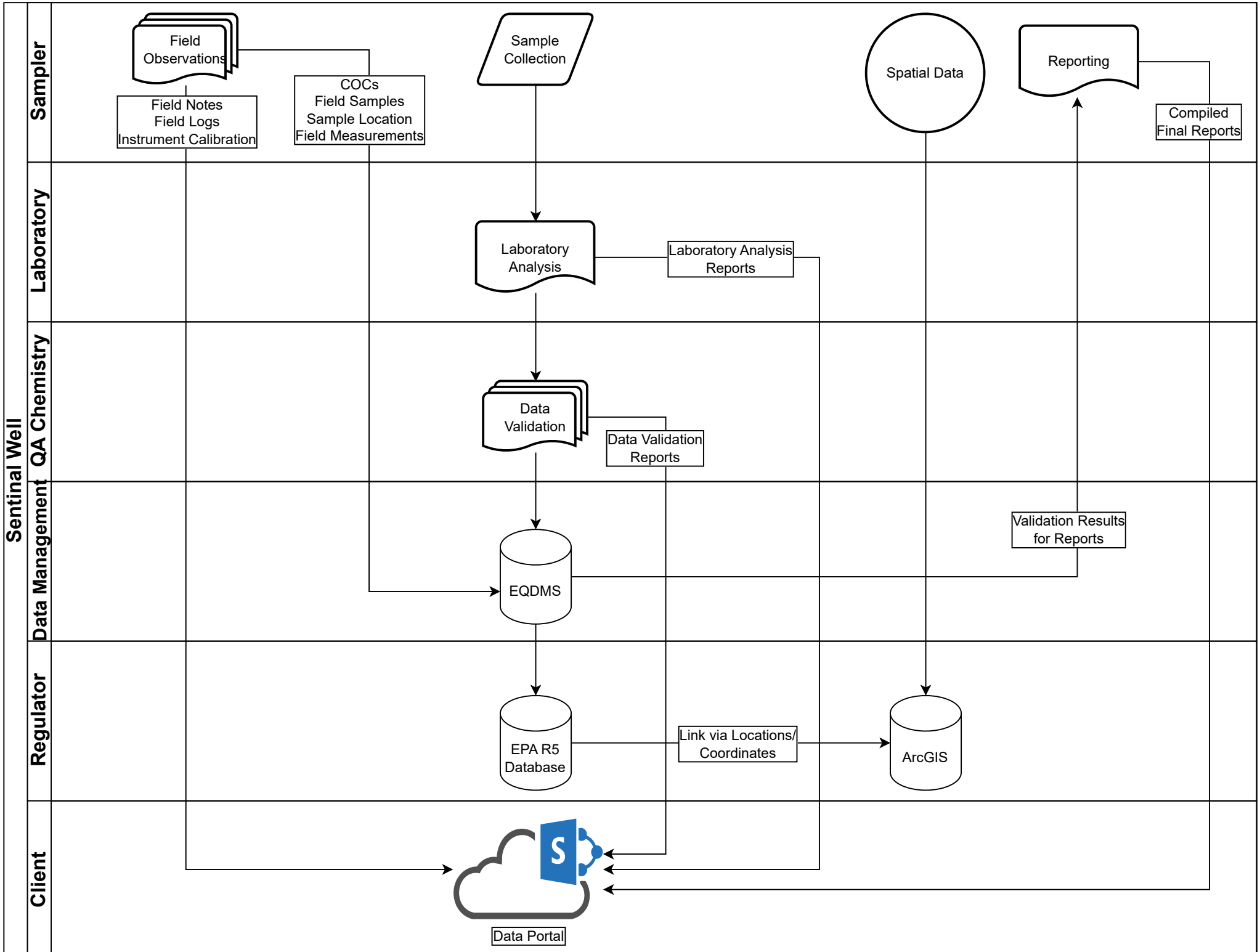


Fri Mar 31 2023 17:10:06

Appendix C – EQuIS Field EDD Specifications

EQuIS Field EDD Specifications

Norfolk Southern
East Palestine, OH Derailment

March 21, 2023

INTRODUCTION

The purpose of this document is to describe the deliverable format of the field data and includes the required specifications of the electronic data deliverable (EDD).

FILE FORMAT

All data from the field must be stored in an ASCII file using a tab-delimited standard format. Maximum length of text fields is indicated in the parentheses. If the information is less than the maximum length, do not pad the record with spaces.

Each record must be terminated with a carriage return/line feed (*i.e.*, standard DOS text file). The file can be produced using any software with the capability to create ASCII files. Date is reported as MM/DD/YYYY (month/day/year) and time as HH:MM (hour: minute). Time uses a 24-hour clock, thus 3:30 p.m. will be reported as 15:30. Note that seconds should not be included in the time portion of any date fields.

Each record in an import file must have one or more fields with values that make the row unique. These fields are indicated with “PK” in the “PRIMARY KEY?” column. Required fields are indicated “Y” in the “REQUIRED?” column.

Reference Value fields noted with “RVF” indicate the use of EPA Region5 EQuIS reference values.

NULL FORMAT

Some fields in the EDD are optional or only required “when applicable”. When a field is <u>not</u> listed as required, this means that a null or blank may be appropriate. However, the blank value must still be surrounded by tabs. In other words, the number of fields is always the same, whether the fields include data.

NAMING CONVENTION

The filename extensions are used to indicate the file type as follows:

Type of Rows	File Name
Location	Location_v1.txt
Well	Well_v1.txt
Well Construction	WellConstruction_v1.txt
Water Level	WaterLevel_v1.txt
Field Sample	FIeldSample_v1.txt
Field Results	FieldResults_v1.txt

FILE DELIVERY

All EDD deliverables must be sent in a zip file containing the EDD files listed above. The zipped file must be named using the following naming convention:

- *COC*.EPTD.EQEDD.zip

EDD SPECIFICATION

Location_v1

Describes locations within a facility, and includes such information as location code, depth to bedrock, drilling method, location type, etc.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	data_provider	Text(40)				Data Provider
2	sys_loc_code	Text(20)	Y	PK		Location identifier of sample collection, soil boring, or well installation
3	x_coord	Numeric	Y			Sampling location numeric *X* coordinate
4	y_coord	Numeric	Y			Sampling location numeric *Y* coordinate
5	surf_elev	Numeric				Sampling location surface elevation
6	elev_unit	Text(15)			RVF	Unit of measurement for elevations
7	coord_type_code	Text(20)	Y		RVF	Sampling location coordinate system description
8	observation_date	DateTime				Date observation or site survey was made
9	coord_identifier	Text(20)	Y			This field is a coordinate identifier. Typical values include 'PRIMARY', 'SECONDARY' or '1', '2'
10	horz_collect_method_code	Text(20)	Y		RVF	Use codes in horizontal collection method valid value table in appendix. Method used to determine the latitude/longitude.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
11	horz_accuracy_value	Text(20)	Y			Accuracy range (+/-) of the latitude and longitude
12	horz_accuracy_unit	Text(15)	Y		RVF	Unit of the horizontal accuracy value
13	horz_datum_code	Text(20)	Y		RVF	Reference datum of the latitude and longitude
14	elev_collect_method_code	Text(20)			RVF	Method used to determine the ground elevation of the sampling location
15	elev_accuracy_value	Text(20)				Accuracy range (+/-) of the elevation measurement
16	elev_accuracy_unit	Text(15)			RVF	Unit of the elevation accuracy value
17	elev_datum_code	Text(20)			RVF	Reference datum for the elevation measurement
18	source_scale	Text(20)				Scale of the source used to determine the latitude and longitude
19	subcontractor_name_code	Text(40)			RVF	Name or code of sampling company
20	verification_code	Text(20)				Verification code
21	reference_point	Text(50)				Describes the place at which geologic coordinates were established
22	geometric_type_code	Text(20)			RVF	Geometric type code
23	rank	Numeric				Rank
24	loc_name	Text(40)				Sampling location name
25	loc_desc	Text(255)				Sampling location description
26	loc_type	Text(20)			RVF	Sampling location type
27	loc_purpose	Text(50)				Sampling location purpose
28	subfacility_code	Text(20)				Unique code for site or area

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
29	within_facility_yn	Text(1)			ENUM	Indicates whether this sampling location is within facility boundaries, 'Y' for yes or 'N' for no.
30	loc_county_code	Text(30)				Location county code; controlled vocabulary using FIPS (Federal Information Processing Standard) codes
31	loc_district_code	Text(20)				Location district code; controlled vocabulary using FIPS codes
32	loc_state_code	Text(10)			RVF	Location state code; controlled vocabulary using FIPS codes
33	loc_major_basin	Text(20)			RVF	Location major basin; controlled vocabulary using HUC (Hydrologic Unit Codes)
34	loc_minor_basin	Text(20)				Location minor basin; controlled vocabulary using HUC codes
35	remark	Text(2000)				Location specific comment.
36	total_depth	Numeric				Total depth below ground surface of boring
37	depth_to_bedrock	Numeric				Depth below ground surface of bedrock
38	depth_to_top_of_screen	Numeric				Depth below ground surface to the top of the well screen. Leave null if sample is not from well.
39	depth_to_bottom_of_screen	Numeric				Depth below ground surface to bottom of well

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						screen. Leave null if sample is not from well.
40	depth_unit	Text(15)			RVF	Unit of measurement for depths
41	top_casing_elev	Numeric				Elevation of the top of casing. Leave null if sample is not from well.
42	datum_value	Numeric				Datum value
43	datum_unit	Text(15)			RVF	Datum unit
44	step_or_linear	Text(6)			ENUM	Step or linear
45	datum_collection_method_code	Text(20)				Datum collection method code
46	datum_desc	Text(255)				Datum description
47	datum_start_date	DateTime				Datum start date
48	geologist	Text(50)				Geologist
49	inspector	Text(50)				Inspector
50	bore_id	Text(30)				The identifier of the drilled borehole.
51	loc_type_2	Text(30)				A secondary field for the type of location.
52	log_date	DateTime				The date the location was logged.
53	stream_code	Text(30)				The identifying code that describes the stream nearest to a specific location.
54	stream_mile	Numeric				This indicates where the river or stream (stream_code) for the station exists.

Well_v1

Describes general information regarding installation of wells.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_loc_code	Text(20)	Y	Y		Well installation location.
2	well_id	Text(30)				Well ID
3	well_description	Text(255)				Used for additional well description, if necessary
4	well_owner	Text(50)				Name of entity that owns the well
5	well_purpose	Text(20)				Purpose of well
6	well_status	Text(20)				Current status of well
7	top_casing_elev	Numeric				Elevation of the top of well casing
8	datum_value	Numeric				Value of datum used to reference water level measurements
9	datum_unit	Text(15)			RVF	Unit of measure for the well datum
10	datum_desc	Text(255)				Description of the datum, such as 'top of well casing'
11	step_or_linear	Text(6)			ENUM	If a section of the well casing was removed or added, use 'step' as the value. If nothing was added or removed from the last survey, use 'linear' as the value.
12	datum_start_date	DateTime				Date that datum was first used in MM/DD/YYYY format
13	datum_collection_method_code	Text(20)			RFF	Method used to determine the datum elevation

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
14	depth_of_well	Numeric				Depth below ground surface of the well bottom
15	depth_unit	Text(15)			RVF	Unit of measurement for depth
16	depth_measure_method	Text(20)				Method of measuring depth of well
17	stickup_height	Text(8)				Height of casing above ground surface
18	stickup_unit	Text(15)			RVF	Unit of measure for the stickup height
19	sump_length	Text(20)				Length of sump
20	sump_unit	Text(15)			RVF	Unit of measure for the sump length
21	installation_date	DateTime				Date of well installation in MM/DD/YYYY format
22	construct_start_date	DateTime				Date well construction began in MM/DD/YYYY format
23	construct_complete_date	DateTime				Date well construction was completed in MM/DD/YYYY format
24	construct_contractor	Text(40)			RVF	Name of contractor that installed well
25	pump_type	Text(20)				Type of pump used at well such as centrifugal, propeller, jet, helical, rotary, *etc*.
26	pump_capacity	Text(6)				Capacity of pump
27	pump_unit	Text(15)			RVF	Unit of measure for the pump capacity and yield
28	pump_yield	Text(6)				The yield of the pump
29	pump_yield_method	Text(20)				Method used for pump yield

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
30	weep_hole	Text(1)			ENUM	Is there a weep hole? 'Y' for yes or 'N' for no
31	head_configuration	Text(50)				Description of the well head
32	access_port_yn	Text(1)			ENUM	Is there an access port? 'Y' for yes or 'N' for no
33	casing_joint_type	Text(50)				Type of casing joint such as threaded, flush, or solvent welded
34	perforator_used	Text(50)				Description of well perforation such as slotted, drilled, or wound
35	intake_depth	Numeric				Depth below ground surface of the well intake
36	disinfected_yn	Text(1)			ENUM	Was well disinfected? 'Y' for yes or 'N' for no
37	historical_reference_elev	Numeric				Historical reference value. Used for the elevation of past reference points
38	geologic_unit_code	Text(20)				Geologic unit in which the well intake is installed
39	remark	Text(2000)				General remarks

WellConstruction_v1

Contains well completion data of environmental wells.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_loc_code	Text(20)	Y	PK		Soil boring or well installation location
2	segment_type	Text(20)	Y	PK	RVF	Type of segment within well (*e.g.*, protective casing, well casing, screen, *etc.*)
3	material_type_code	Text(20)	Y	PK	RVF	Material description of well segment
4	start_depth	Numeric	Y	PK		Depth below ground surface of the top of the segment
5	end_depth	Numeric				Depth below ground surface of the bottom of the segment
6	depth_unit	Text(15)			RVF	The unit of depth measurements
7	inner_diameter	Numeric				The inside diameter of segment
8	outer_diameter	Numeric				The outside diameter of the segment
9	diameter_unit	Text(15)			RVF	The unit of measure for diameter measurement
10	thickness	Numeric				Thickness of the well segment
11	thickness_unit	Text(15)			RVF	The unit of measurement for thickness
12	slot_type	Text(20)				Type of slots such as bridge, shutter, and continuous
13	slot_size	Numeric				Width of slots
14	slot_size_unit	Text(15)			RVF	The unit of measurement for slot size
15	perf_length	Numeric				Length of perforated portion of screen
16	screen_type	Text(15)				Type of screen

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
17	material_quantity	Text(20)				Quantity of material used. Applicable to annular seal/fill material.
18	material_density	Text(20)				Density of the annular seal material
19	remark	Text(2000)				Remarks regarding the well segment

WaterLevel_v1

Contains information regarding water level collection data.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_loc_code	Text(20)	Y	PK		Soil boring or well installation location
2	measurement_date	DateTime	Y	PK		Date and time of water level measurement in MM/DD/YYYY HH:MM format
3	equipment_code	Text(60)				Equipment code used to define equipment used during sampling event
4	historical_reference_elev	Numeric				Historical reference value. Used for the elevation of past reference points.
5	water_level_depth	Numeric				Depth of ground water below datum defined in well table
6	water_level_elev	Numeric				Elevation of water level.
7	corrected_depth	Numeric				Depth of water level after any necessary corrections
8	corrected_elev	Numeric				Corrected water level elevation.
9	measured_depth_of_well	Numeric				The depth below ground surface to the bottom of the well
10	depth_unit	Text(15)			RVF	Use values from Unit valid value table. Unit of measure for depths.
11	Technician	Text(50)				Name of technician
12	dry_indicator_yn	Text(1)			ENUM	Is the well dry? 'Y' for yes or 'N' for no
13	measurement_method	Text(20)			ENUM	Method used to make water level measurements
14	batch_number	Text(10)				Batch number

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
15	dip_or_elevation	Text(10)			ENUM	Use either 'elevation' or 'dip'. Use 'elevation' if water level measurement is above the datum (*i.e.*, artesian well) or 'dip' if water level is below datum.
16	Remark	Text(2000)				Remark on measurement
17	lnapl_cas_rn	Text(15)			RVF	LNAPL_cas_rn
18	lnapl_depth	Numeric				LNAPL_depth
19	dnapl_cas_rn	Text(15)			RVF	DNAPL_cas_rn
20	dnapl_depth	Numeric				DNAPL_depth
21	task_code	Text(40)				Code used to identify the task under which the field sample was taken
22	approval_code	Text(10)				
23	custom_field_1	Text(255)				
24	custom_field_2	Text(255)				
25	custom_field_3	Text(255)				
26	custom_field_4	Text(255)				
27	custom_field_5	Text(255)				
28	reportable_yn	Text(1)			ENUM	Reportable measurements

FieldSample_v1

Describes field sample parameters, such as chain of custody, collection quarter, equipment code and filter type, of samples.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_sample_code	Text(40)	Y	PK		Unique sample identifier. This should be the unique identifier from the Chain-of-Custody.
2	sample_name	Text(50)				Additional sample identification information as necessary. Is not required to be unique
3	sample_matrix_code	Text(10)	Y		RVF	Code which distinguishes between different types of sample matrix
4	sample_type_code	Text(20)	Y		RVF	Code which distinguishes between different types of samples.
5	sample_source	Text(10)			ENUM	This field identifies where the sample came from, either Field or Lab. In this import, this should always be Field.
6	parent_sample_code	Text(40)				The value of "sys_sample_code" that uniquely identifies the sample that was the source of this sample. For example, the value of this field for a duplicate sample would identify the normal sample of which this sample is a duplicate.
7	sample_delivery_group	Text(20)				The sampling event with which the sample is associated

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
8	sample_date	DateTime	Y			Date and time sample was collected (in MM/DD/YYYY HH:MM format)
9	sys_loc_code	Text(20)				Soil boring or well installation location
10	start_depth	Numeric				Beginning depth (top) of sample below ground surface
11	end_depth	Numeric				Ending depth (bottom) of sample below ground surface
12	depth_unit	Text(15)			RVF	Unit of measurement for the sample begin and end depths
13	chain_of_custody	Text(40)				Chain of custody identifier. A single sample may be assigned to only one Chain-of-Custody.
14	sent_to_lab_date	DateTime				Date sample was sent to laboratory (in MM/DD/YYYY format)
15	sample_receipt_date	DateTime				Date that sample was received at laboratory (in MM/DD/YYYY format)
16	sampler	Text(50)				Name or initials of sampler
17	sampling_company_code	Text(40)			RVF	Name or initials of sampling company (not controlled vocabulary)
18	sampling_reason	Text(30)				Report as null
19	sampling_method	Text(40)			RVF	Sampling method
20	task_code	Text(40)				Code used to identify the task under which the field sample was retrieved
21	collection_quarter	Text(5)				format: YYQ# where YY is year and # is 1, 2, 3, or 4 representing which quarter.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
22	composite_yn	Text(1)			ENUM	Is sample a composite sample? 'Y' for yes or 'N' for no
23	composite_desc	Text(255)				Description of composite sample (if composite_yn is 'Yes')
24	sample_class	Text(10)				Report as null
25	custom_field_1	Text(255)				Report as null
26	custom_field_2	Text(255)				Report as null
27	custom_field_3	Text(255)				Report as null
28	geologic_unit_code	Text(40)			RVF	The geologic unit (*e.g.* stratigraphy) from which the sample was taken
29	comment	Text(2000)				Comment
30	filter_type	Text(20)				Filter Type

SampleParameter_v1

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
	sys_sample_code	Text(40)	Y	PK		Unique sample identifier
	measurement_date	DateTime				Measurement date and time
	param_code	Text(20)	Y	PK	RVF	Parameter code
	param_value	Text(255)				Parameter value
	param_unit	Text(15)			RVF	Unit of measure for parameter value
	measurement_method	Text(20)			ENUM	Measurement method
	remark	Text(2000)				Remark

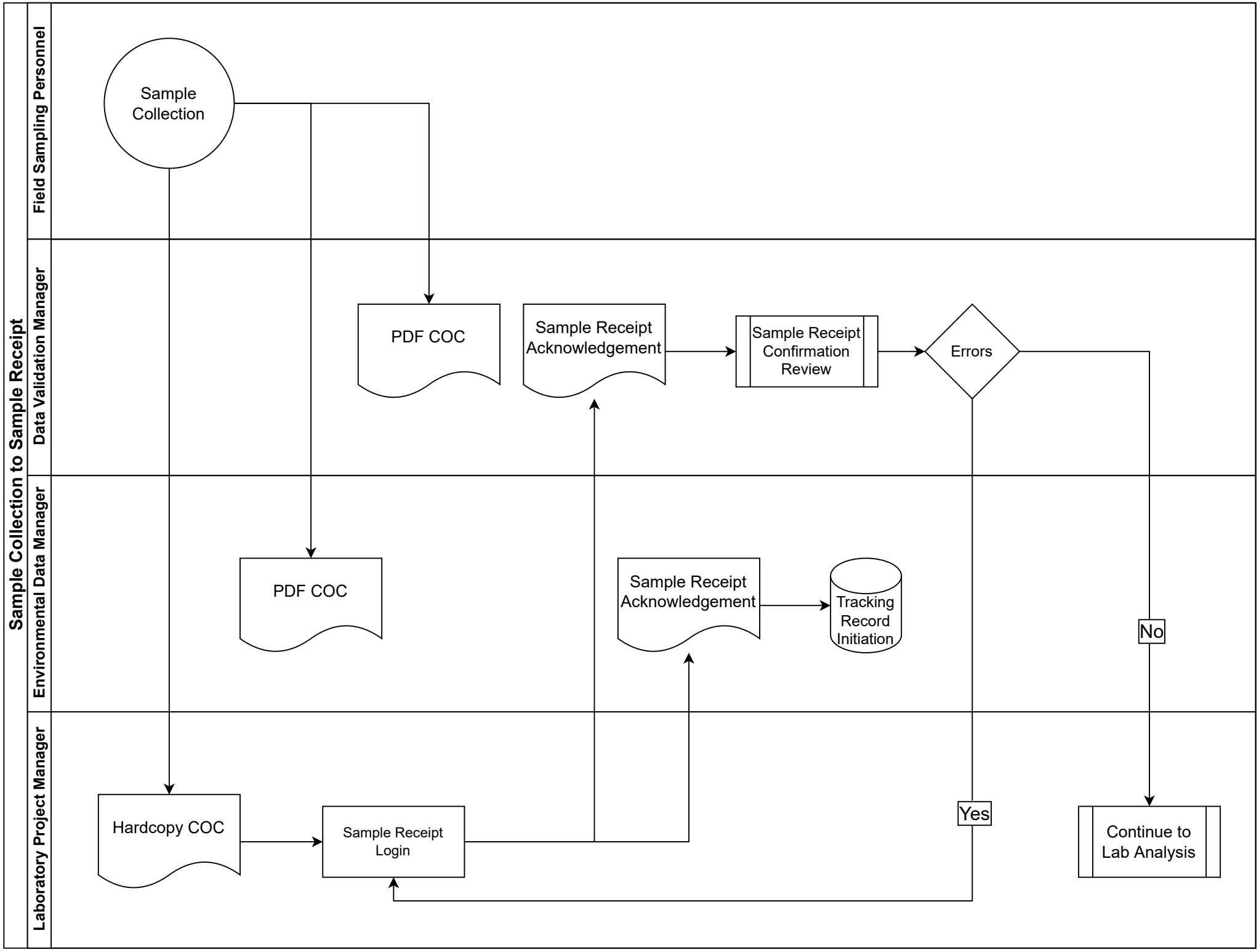
FieldResults_v1

Contains data on field results.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	data_provider	Text(40)			RVF	Data Provider.
2	sys_loc_code	Text(20)	PK	Y		Unique Station ID. Required for mapping.
3	sys_sample_code	Text(40)	PK	Y		Sample code
4	cas_rn	Text(15)	PK	Y	RVF	Field parameter by CASRN.
5	chemical_name	Text(255)				Field parameter by chemical name
6	start_depth	Numeric				Sample start depth
7	end_depth	Numeric				Sample end depth
8	depth_unit	Text(15)				Sample depth unit
9	result_date	DateTime	PK	Y		Result date/time (mm/dd/yr hh:mm:ss)
10	result_value	Text(19)		Y		Result value
11	result_unit	Text(15)		Y	RVF	Result unit
12	quantitation_limit	Text(20)				Quantitation limit
13	task_code	Text(40)				Code used to identify the task under which the field sample was retrieved
14	sample_matrix_code	Text(10)		Y	RVF	Sample matrix code
15	qualifier	Text(20)			RVF	Qualifier
16	sampling_company_code	Text(40)			RVF	sampling reason
17	sampling_reason	Text(30)				sampling reason
18	sampling_method	Text(40)				Sampling method
19	reportable_result	Text(10)		Y	ENUM	Reportable result
20	value_type	Text(10)			ENUM	How value was derived
21	remark	Text(2000)				Remark
22	detect_flag	Text(2)		Y	ENUM	May be either 'Y' for detected analytes or 'N' for non_detects

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						or 'TR' for trace. Use 'Y' for estimated values (above detection limit but below the quantitation limit)

Appendix D – Sample Collection to Sample Receipt


Sample Collection to Sample Receipt
Field Sampling Personnel
Data Validation Manager
Environmental Data Manager
Laboratory Project Manager
Sample Collection
PDF COC
Sample Receipt Acknowledgement
Sample Receipt Confirmation Review
Errors
PDF COC
Sample Receipt Acknowledgement
Tracking Record Initiation
No
Hardcopy COC
Sample Receipt Login
Yes
Continue to Lab Analysis

Appendix E – Tracking

Appendix D - Tracking Items

Appendix F – Laboratory Level 2 Data Deliverables

Laboratory Level 2 Data Deliverables

Norfolk Southern
East Palestine, OH Derailment

March 21, 2023

Laboratory Level 2 Data Deliverable Specification

Level 2 Data Packages will contain data for all samples in on Sample Delivery Group (SDG). All Level 2 Data Packages will include the following information:

Documentation

- Cover Letter/Letter of Transmittal signed by Laboratory Project Manager or designee
- Case Narrative signed and dated by Project Manager or designee
    - This document must be clearly labeled “Case Narrative” and shall identify laboratory name; SDG number; Norfolk Southern sample identifications; laboratory sample numbers; and a glossary of qualifier codes.
    - This Case Narrative must include a statement or statements relative to compliance with this document and any applicable project documents and description of any deviations from these documents.
    - This Case Narrative must include detailed documentation of any QC, sample, shipment, and/or analytical problems encountered in processing (preparing and analyzing) the Norfolk Southern samples reported in the data package, and any corrective actions taken with their respective resolutions.
    - This Case Narrative must include references to preparation and analytical methods performed and applicable project documents (i.e., QAPP), any problems encountered, both technical and administrative, corrective actions taken and resolution, and an explanation of all flagged edits (i.e., exhibit edits) on quantitation reports (including results flagged due to storage blank contamination).
- Field and Internal (Laboratory) Chain-of-Custody Records
    - Sample Receipt Documentation
    - Copies of both the external and internal Chain-of-Custody Records for all samples within the SDG must be included in the deliverables. The Chain-of-Custody Records or sample receipt documentation will list all pH measurements for all samples requiring pH adjustment for preservation.
        - Note: pH values for VOA samples are recorded at the instrument at the time of analysis and these records should be supplied.

Results and QC

- analytical results summaries for all (when applicable):
    - samples
    - method blanks
    - matrix spike [MS]/MS duplicate [MSD]
    - laboratory duplicate [LD]
    - laboratory control samples [LCS]/laboratory control duplicates [LCSD]
    - MS/MSD recovery and precision
    - LCS/LCSD recovery and precision
    - surrogate percent recovery

Appendix G – EQuIS Laboratory EDD Specifications

EQuIS EQEDD Laboratory EDD Specifications

Norfolk Southern
East Palestine, OH Derailment

March 21, 2023

INTRODUCTION

The purpose of this document is to describe the format and delivery of the laboratory data and provides the required specifications of the electronic data deliverable (EDD).

FILE FORMAT

All data from the laboratory must be stored in an ASCII file using a tab-delimited standard format. Maximum length of text fields is indicated in the parentheses. If the information is less than the maximum length, do not pad the record with spaces.

Each record must be terminated with a carriage return/line feed (*i.e.,* standard DOS text file). The file can be produced using any software with the capability to create ASCII files. Date is reported as MM/DD/YYYY (month/day/year) and time as HH:MM (hour:minute). Time uses a 24-hour clock, thus 3:30 p.m. will be reported as 15:30. Note that seconds should not be included in the time portion of any date fields.

Each record in an import file must have one or more fields with values that make the row unique. These fields are indicated by “PK” in the “PRIMARY KEY?” column. Required fields are indicated by “Y” in the “REQUIRED?” column.

Reference Value fields noted with “RVF” indicate the use of EPA Region5 EQuIS reference values.

NULL FORMAT

Some fields in the EDD are optional or only required “when applicable”. When a field is <u>not</u> listed as required, this means that a null or blank may be appropriate. However, the blank value must still be surrounded by tabs. In other words, the number of fields is always the same, whether the fields include data.

NAMING CONVENTION

The filename extensions are used to indicate the file type as follows:

Type of Rows	File Name
Lab Sample	LabSample_v1.txt
Test & Results	TestResultsQC_v1.txt
Test Batch	TestBatch_v1.txt

FILE DELIVERY

All EDD deliverables must be sent in a zip file containing the EDD files listed above. The zipped file must be named using the following naming convention:

- *LABSDG*.EPTD.EQEDD.zip

Revisions should be noted with the appendage "_rev#" in the LABSDG portion of the file name, with the number increasing to note each iteration of EDD delivery.

The above tables in the Lab portion of the EQEDD Specification are to be populated. No other tables/portions of the EQEDD specification are to be provided.

EDD SPECIFICATION

LabSample_v1

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_sample_code	Text (40)	Y	PK		Unique sample identifier. For Field Samples, this should be the unique identifier from the Chain-of-Custody. For Laboratory-derived Samples, this should be the unique identifier assigned by the laboratory, followed by an underscore ("_") and the Laboratory Sample Delivery Group (TestResultsQC_v1.lab_sdg)
2	sample_name	Text (50)	Y			The same value as sys_sample_code
3	sample_matrix_code	Text (10)	Y		RVF	Code which distinguishes between different of sample matrix types.
4	sample_type_code	Text (20)	Y		RVF	Code which distinguishes between different types of samples.
5	sample_source	Text (10)	Y		ENUM	This field identifies where the sample came from, either "FIELD" or "LAB".
6	parent_sample_code	Text (40)	When applicable			The value of "sys_sample_code" that uniquely identifies the sample that was the source of this sample.
7	sample_delivery_group	Text (20)				The laboratory assigned sample

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						delivery group.
8	sample_date	DateTime	Y			Date and time sample was collected (in MM/DD/YYYY HH:MM format for EDD). For lab samples, enter the minimum date of all field samples in the EDD.
9	sys_loc_code	Text (20)	When Applicable			Location of sample
10	start_depth	Numeric				Beginning depth (top) of sample in feet below ground surface.
11	end_depth	Numeric				Ending depth (top) of sample in feet below ground surface.
12	depth_unit	Text (15)			RVF	Unit of measurement for the sample begin and end depths.
13	chain_of_custody	Text (40)				Chain-of-Custody identifier. A single sample may be assigned to only one Chain-of-Custody.
14	sent_to_lab_date	DateTime				Date sample was sent to laboratory (in MM/DD/YYYY format for EDD).
15	sample_receipt_date	DateTime	When applicable			Date that sample was received at laboratory (in MM/DD/YYYY format for EDD).
16	sampler	Text (50)				Name or initials of sampler.
17	sampling_company_code	Text (40)	Y		RVF	Name or initials of sampling company
18	sampling_reason	Text (30)				
19	sampling_method	Text (40)				Sampling method.
20	task_code	Text (40)				Code used to identify the task under which the field sample was retrieved.
21	collection_quarter	Text (6)				Format: YYQ# where YY is year

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						and # is 1,2,3,or 4 representing the quarter.
22	composite_yn	Text (1)	Y	ENUM		Is sample a composite sample? 'Y' for yes or 'N' for no.
23	composite_desc	Text (255)				Description of composite sample (if composite_yn is 'Yes').
24	sample_class	Text (10)				Report as null.
25	custom_field_1	Text (255)				Report as null.
26	custom_field_2	Text (255)				Report as null.
27	custom_field_3	Text (255)				Report as null.
28	comment	Text (2000)				Comment.

TestResultsQC_v1

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_sample_code	Text (40)	Y	PK		Unique sample identifier. For Field Samples, this should be the unique identifier from the Chain-of-Custody. For Laboratory-derived Samples, this should be the unique identifier assigned by the laboratory, followed by an underscore (“_”) and the Laboratory Sample Delivery Group (TestResultsQC_v1 .lab_sdg)

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
2	lab_anl_method_name	Text (20)	Y	PK	RVF	Laboratory analytical method name or description.
3	analysis_date	DateTime	Y	PK		Date and time of sample analysis in 'MM/DD/YYYY HH:MM' format.
4	total_or_dissolved	Text (10)	Y	PK	RVF	Must be either 'D' for dissolved or filtered [metal] concentration, 'T' for total or undissolved, or "N" for everything else.
5	column_number	Text (2)				Values include either '1C' for first-column analyses, '2C' for second-column analyses, or 'NA' for tests for which this distinction is not applicable.
6	test_type	Text (10)	Y	PK	RVF	Type of test.
7	lab_matrix_code	Text (10)	Y		RVF	Code which distinguishes the type of sample matrix.
8	analysis_location	Text (2)	Y		ENUM	Must be either 'FI' for field instrument, 'FL' for mobile field laboratory analysis, or 'LB' for fixed-based laboratory analysis.
9	basis	Text (10)	Y		ENUM	Must be either 'Wet' for wet-weight basis reporting, 'Dry' for dry-weight basis reporting, or 'NA' for tests for which this distinction is not applicable.
10	container_id	Text (30)				Identification number of sample container
11	dilution_factor	Numeric	Y			Effective test dilution factor.
12	prep_method	Text (20)			RVF	Laboratory sample

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						preparation method name
13	prep_date	DateTime				Beginning date and time of sample preparation in 'MM/DD/YYYY HH:MM' format.
14	leachate_method	Text (15)				Laboratory leachate generation method name.
15	leachate_date	DateTime				Beginning date and time of leachate preparation in 'MM/DD/YYYY HH:MM' format.
16	lab_name_code	Text (20)	Y		RVF	Unique identifier of the laboratory.
17	qc_level	Text (10)	Y		ENUM	May be either 'screen' or 'quant'.
18	lab_sample_id	Text (20)	Y			Laboratory LIMS sample identifier.
19	percent_moisture	Text (5)				Percent moisture of the sample portion used in this test.
20	subsample_amount	Text (14)				Amount of sample used for test.
21	subsample_amount_unit	Text (15)			RVF	Unit of measurement for subsample amount.
22	analyst_name	Text (50)				Name or initials of lab analyst
23	instrument_id	Text (60)				Instrument identifier.
24	comment	Text (2000)				Comments about the test.
25	preservative	Text (20)			RVF	Sample preservative used.
26	final_volume	Numeric				The final volume of the sample after sample preparation. Include all dilution factors.
27	final_volume_unit	Text (15)			RVF	The unit of measure that

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						corresponds to the final_volume.
28	cas_rn	Text (15)	Y	PK	RVF	Use values in analyte valid value table.
29	chemical_name	Text (255)	Y			Chemical name associated with reported cas_rn.
30	result_value	Numeric				Analytical result reported at an appropriate number of significant digits. Must be blank for non-detects.
31	result_error_delta	Text (20)				Error range applicable to the result value; typically used only for radiochemistry results.
32	result_type_code	Text (10)	Y		RVF	Must be either 'TRG' for a target or regular result, 'TIC' for tentatively identified compounds, 'SUR' for surrogates, 'IS' for internal standards, or 'SC' for spiked compounds.
33	reportable_result	Text (10)	Y		ENUM	Must be either 'Yes' for results which are reportable, or 'No' for other results.
34	detect_flag	Text (2)	Y		ENUM	May be either 'Y' for detected analytes ‘N’ for non-detects or 'TR' for trace.
35	lab_qualifiers	Text (20)				Qualifier flags assigned by the laboratory.
36	validator_qualifiers	Text (20)				Qualifier flags assigned by the validation firm.
37	interpreted_qualifiers	Text (20)			RVF	Qualifier flags assigned by the validation firm.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
38	organic_yn	Text (1)	Y		ENUM	Must be either 'Y' for organic constituents, or 'N' for inorganic constituents.
39	method_detection_limit	Text (20)				Method detection limit.
40	reporting_detection_limit	Numeric				If the results are reported to the method_detection_limit, report the method_detection_limit. If the results are reported to the quantitation_limit, report the quantitation_limit.
41	quantitation_limit	Text (20)				Concentration level above which results can be quantified with confidence.
42	result_unit	Text (15)			RVF	Unit of measurement for the result.
43	detection_limit_unit	Text (15)			RVF	Unit of measurement for the detection limit(s).
44	tic_retention_time	Text (8)				Retention time in seconds for tentatively identified compounds.
45	result_comment	Text (2000)				Result-specific comments.
46	lab_sdg	Text (20)	Y			Laboratory assigned Sample Delivery Group (SDG) identifier.
47	qc_original_conc	Numeric				The concentration of the analyte in the original (unspiked) sample.
48	qc_spike_added	Numeric				The concentration of the analyte added to the original sample.
49	qc_spike_measured	Numeric				The measured concentration of the analyte.

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
50	qc_spike_recovery	Numeric				The percent recovery calculated as specified by the laboratory QC program.
51	qc_dup_original_conc	Numeric				The concentration of the analyte in the original (unspiked) sample.
52	qc_dup_spike_added	Numeric				The concentration of the analyte added to the original sample.
53	qc_dup_spike_measured	Numeric				The measured concentration of the analyte in the duplicate.
54	qc_dup_spike_recovery	Numeric				The duplicate percent recovery calculated.
55	qc_rpd	Text (8)				The relative percent difference calculated.
56	qc_spike_lcl	Text (8)				Lower control limit for spike recovery.
57	qc_spike_ucl	Text (8)				Upper control limit for spike recovery.
58	qc_rpd_cl	Text (8)				Relative percent difference control limit.
59	qc_spike_status	Text (10)			ENUM	Used to indicate whether the spike recovery was within control limits.
60	qc_dup_spike_status	Text (10)			ENUM	Used to indicate whether the duplicate spike recovery was within control limits.
61	qc_rpd_status	Text (10)			ENUM	Used to indicate whether the relative percent difference was within control limits.

TestBatch_v1

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	sys_sample_code	Text(40)	Y	PK		Unique sample identifier. For Field Samples, this should be the unique identifier from the Chain-of-Custody. For Laboratory-derived Samples, this should be the unique identifier assigned by the laboratory, followed by an underscore ("_") and the Laboratory Sample Delivery Group (TestResultsQC_v1 .lab_sdg)
2	lab_anl_method_name	Text (20)	Y	PK	RVF	Laboratory analytical method name or description.
3	analysis_date	DateTime	Y	PK		Date and time of sample analysis in 'MM/DD/YYYY HH:MM' format.
4	total_or_dissolved	Text (10)	Y	PK	RVF	Must be either 'D' for dissolved or filtered [metal] concentration, 'T' for total or undissolved, or 'N' for everything else.
5	column_number	Text (2)				Values include either '1C' for first-column analyses, '2C' for second-column analyses, or 'NA' for tests for which this distinction is not applicable.
6	test_type	Text (10)	Y	PK	RVF	Type of test.
7	test_batch_type	Text (10)	Y	PK	RVF	Laboratory batch type. Valid values include 'Prep', 'Analysis', and 'Leach'. This is a required field for

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						all batches.
8	test_batch_id	Text (20)	Y			Unique identifier for all laboratory batches.

“REQUIRED WHEN APPLICABLE” FIELDS

Some “Required When Applicable” fields are data driven and are, therefore, not listed below.

SAMPLE LEVEL

	BD	BS	EB	FB	FD	LB	LD	LR	MB	MS	N	RB	SD	TB
PARENT_SAMPLE_CODE	X				X		X	X		X			X	
SAMPLE_RECEIPT_DATE			X	X	X					X	X	X	X	X
SYS_LOC_CODE					X					X	X		X	

RESULT LEVEL-TARGET & SPIKED RESULTS (TRG & SC)

	BD	BS	EB	FB	FD	LB	LD	LR	MB	MS	N	RB	SD	TB
QC_ORIGINAL_CONC		X			X			X		X				
QC_SPIKE_ADDED		X								X				
QC_SPIKE_MEASURED		X								X				
QC_SPIKE_RECOVERY		X								X				
QC_DUP_ORIGINAL_CONC													X	
QC_DUP_SPIKE_ADDED													X	
QC_DUP_SPIKE_MEASURED	X												X	
QC_DUP_SPIKE_RECOVERY	X												X	
QC_RPD	X							X					X	

RESULT LEVEL-SURROGATE RESULTS (SUR)

	BD	BS	EB	FB	FD	LB	LD	LR	MB	MS	N	RB	SD	TB
QC_SPIKE_ADDED		X	X	X		X		X	X	X	X	X		X
QC_SPIKE_MEASURED		X	X	X		X		X	X	X	X	X		X
QC_SPIKE_RECOVERY		X	X	X		X		X	X	X	X	X		X
QC_DUP_SPIKE_ADDED	X												X	
QC_DUP_SPIKE_MEASURED	X												X	
QC_DUP_SPIKE_RECOVERY	X												X	

Appendix H – Laboratory Level 3 Data Deliverables

Laboratory Level 3 Data Deliverables

Norfolk Southern
East Palestine, OH Derailment

March 21, 2023

LEVEL 4 DATA PACKAGE DELIVERABLE SPECIFICATIONS

Required Data Deliverables Elements

All Sample Data Packages will include data for analyses of all samples in one SDG, including field samples, reanalyses, secondary dilutions, blanks, LCS, LCSD, MS, MSD, and/or laboratory duplicates. A fraction-specific unit is not a required deliverable if the analysis of that fraction was not required for samples in the SDG. The Sample Data Package must be complete before submission and must be consecutively paginated. The Sample Data Package will be arranged in the following order:

- Cover Letter/Letter of Transmittal signed by Laboratory Project Manager or designee
- Title Page
- Table of Contents
- SDG Narrative

The SDG Narrative will be clearly labeled "SDG Narrative" and will contain laboratory name; SDG number; sample identifications; laboratory sample numbers; and detailed documentation of any QC, sample, shipment, and/or analytical problems encountered in processing (preparing and analyzing) the samples reported in the data package. A glossary of qualifier codes used in the SDG must also be provided.

The laboratory must also include reference to preparation and analytical methods performed and applicable project documents, any problems encountered, both technical and administrative, corrective actions taken and resolution, and an explanation of all flagged edits (*i.e.*, exhibit edits) on quantitation reports (including results flagged due to storage blank contamination).

The SDG Narrative must be signed and dated by the Laboratory Manager or designee. The SDG Narrative must include a statement or statements relative to compliance with this document and any applicable project documents and description of any deviations from these documents:

- Field and Internal (Laboratory) COC Records
- Sample Receipt Documentation Log, and all Project Correspondence

Copies of both the external and internal COC Records for all samples within the SDG must be included in the deliverables. The COC Records will list all temperature and pH measurements for all samples requiring pH adjustment for preservation. (Note: the pH values for VOA samples are recorded at the instrument at the time of analysis and then transcribed onto the COC Records.)

1 Deliverable Requirements for Organic Analyses

In the event that certain required information is not included on a particular form, the laboratory shall provide additional documentation (*e.g.*, preparation logs or analytical runlogs) to ensure that the minimum required level of documentation is supplied.

1.1 Surrogate Percent Recovery Summary must include:

- SDG number
- NORFOLK SOUTHERN sample number
- method blank sample number
- MS/MSD sample number
- LCS/LCSD identification number
- matrix of the summarized samples
- %R for all surrogate compounds
- applicable recovery limits for each surrogate compound

1.2 MS/MSD Summary must include:

- SDG number
- MS/MSD sample number
- matrix of the summarized samples
- NORFOLK SOUTHERN sample number of the non-spiked aliquot
- analysis file numbers for the MS/MSD analyses
- MS/MSD solution lot number
- names of the compounds included in the spike solution
- true concentrations and concentration units for each compound in the MS/MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units for each compound in the MS/MSD
- %R for each compound in the MS/MSD
- recovery limits for each compound
- RPD between the MS/MSD results
- RPD limit for each compound

1.3 LCS/LCSD Summary must include:

- SDG number
- LCS/LCSD matrix
- LCS/LCSD identifier
- analysis file numbers for the LCS/LCSD analyses
- LCS/LCSD solution lot number
- names of the compounds included in the LCS/LCSD solution
- true concentrations and concentration units for each compound in the LCS/LCSD
- observed compound concentrations and concentration units for each compound in the LCS/LCSD

- %R for each compound in the LCS/LCSD
- recovery limits for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

1.4 Method Blank Summary

Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument, and must include:

- SDG number
- matrix of summarized samples
- method blank identifier
- analysis file number for the method blank
- date and time of method blank analysis
- instrument identifier
- compound names for all target compounds and surrogates
- observed compound concentrations and concentration units
- NORFOLK SOUTHERN sample numbers associated with the method blank
- analysis file number for each associated NORFOLK SOUTHERN sample

1.5 GC/MS Tuning and Mass Calibration Summary

The tuning summaries will be arranged in chronological order, by instrument, and must include:

- SDG number
- tuning injection file number
- tuning injection date and time of analysis
- instrument identifier
- percent relative abundance for each required mass ion
- acceptance criteria for each relative abundance
- identifier for each associated QC sample
- each associated NORFOLK SOUTHERN sample number
- analysis file number, date, and time for each associated QC and NORFOLK SOUTHERN sample analysis

1.6 Initial Calibration Summary

The initial calibration summaries will be arranged in chronological order, by instrument, and must include:

- SDG number
- start and end dates and times of the initial calibration
- analysis file numbers for all initial calibration analyses
- instrument identifier
- compound names for all target compounds and surrogates
- calibration factors (CFs) or relative response factors (RRFs) for each initial calibration standard performed

- average CF or RRF for each target compound and surrogate
- percent relative standard deviation (%RSD) for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate, including correlation coefficient (r^2; if applicable)
- percent breakdown for endrin and 4,4′-DDT for pesticide analyses

1.7 ICV Summary

The ICV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of ICV standard
- analysis file number of the ICV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average CF/RRF or true concentration for each target compound and surrogate
- observed ICV standard CF/RRF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

1.8 Continuing Calibration Summary

The continuing calibration summaries will be arranged in chronological order, by instrument and must include:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of continuing calibration standard
- analysis file number of the continuing calibration analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average CF/RRF or true concentration for each target compound and surrogate
- observed continuing calibration standard CF/RRF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

1.9 IS Area and Retention Time Summary

The IS summaries will be arranged in chronological order, by instrument and must include:

- SDG number

- continuing calibration standard file number
- continuing calibration standard date and time of analysis
- instrument identifier
- compound name for each IS
- observed area and RT for each IS in the reference standard
- project samples and QC sample areas and retention times must be compared to the associated continuing calibration standard
- continuing calibration standard areas and RTs must be compared to the midpoint standard of the associated initial calibration
- upper acceptance limit for the area and RT for each IS
- lower acceptance limit for the area and RT for each IS
- each associated NORFOLK SOUTHERN sample number
- observed area and RT for each IS for associated NORFOLK SOUTHERN sample
- identifier for each associated QC sample
- observed area and RT for each IS for associated QC sample

1.10 Sample Data

Sample data will be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
- NORFOLK SOUTHERN sample number
- laboratory sample identifier
- matrix of the NORFOLK SOUTHERN sample
- date of sample collection
- date of analysis
- analysis file number
- sample weight or volume used for extraction/analysis
- sample percent solid content (if applicable)
- final extract sample volume with units
- extract aliquot volume or sample extract injection volume used for analysis with units
- dilution factor
- name and Chemical Abstract Service (CAS) number for each target compound
- concentration of project-required quantitation limit (PRQL) and/or MDL for each target compound
- any applicable flags for target compound results (*e.g.,* “U” to designate a “not-detected” result)
- concentration units

- indication whether sample cleanup (*e.g.,* Florisil, silica gel, gel permeation chromatography [GPC], *etc*.) was performed (where applicable)

TIC Analytical Results Summary (if applicable) that must include the following:

- SDG number
- NORFOLK SOUTHERN sample number
- laboratory sample identifier
- matrix of the NORFOLK SOUTHERN sample
- date of sample collection
- date of analysis
- analysis file number
- sample weight or volume used for analysis
- sample percent solid content (if applicable)
- final extract sample volume
- extract aliquot volume used for analysis
- dilution factor
- name and CAS number (if applicable) for each TIC
- concentration for each TIC
- any applicable flags for TIC results (*e.g.,* "N" to designate a tentatively identified compound name)
- concentration units

1.11 Sample Raw Data

- Reconstructed total ion chromatogram (RIC) and quantitation report (including initial and reintegrations for manually integrated data) for GC/MS data
- Copies of raw mass spectrum and copies of background-subtracted mass spectrum of each target compound identified in the sample and corresponding background- subtracted target compound standard mass spectrum for GC/MS data
- Ratios for the quantitation ion and all confirmation ions
- Quantitation/calculation of TIC concentrations (if applicable)
- Copies of up to 10 non-surrogate and non-IS TICs and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)
- Manual worksheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)

1.12 Standards Raw Data

- Copies of RIC and quantitation report (including initial and reintegrations for manually integrated data) for each initial calibration standard associated with analyses in the SDG, in chronological order, by instrument

- Copies of RIC and quantitation report (including initial and reintegrations for manually integrated data) for each ICV standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and reintegrations for manually integrated data) for each continuing calibration standard associated with analyses in the SDG, in chronological order, by instrument

1.13 Raw QC Data

- For each GC/MS tuning and mass calibration arranged in chronological order, by instrument:
  - Bromofluorobenzene (BFB) or decafluorotriphenylphosphine (DFTPP) bar graph spectrum
  - BFB or DFTPP mass listing

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument:
  - Target Compound Analytical Results Summary (as previously defined)
  - TIC Analytical Results Summary (if applicable, as previously defined)
  - RIC and quantitation reports (including initial and reintegrations for manually-integrated data)
  - Copies of raw spectra and copies of background-subtracted mass spectra of each target compound identified in the blank and corresponding background-subtracted target compound standard mass spectra
  - Quantitation/calculation of TIC concentrations (if applicable)
  - Copies of mass spectra of non-surrogate and non-IS TICs and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)

- LCS/LCSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and reintegrations for manually integrated data)

- MS/MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and reintegrations for manually integrated data)

1.14 Preparation Logs

- Toxicity Characteristic Leaching Procedure (TCLP) or Synthetic Precipitation Leaching Procedure (SPLP) Extraction Logs (if TCLP or SPLP extraction was performed)
- Extraction Logs (including volatile extraction logs when medium-level volatile analyses were performed)
- Sample Preparation Logs (including volatile preparation logs when EnCore or low-level solid volatile analyses were performed)
- Sample Cleanup Logs (if performed)

- Sample pH Logs (if aqueous volatile analyses were performed)

Table 1: Required Deliverables for Organic Analyses

Element	GC/MS Volatile Organic Analyses	GC Volatile Organic Analyses	GC/MS Semivolatile Organic Analyses
Cover Letter/Letter of Transmittal	X	X	X
Case Narrative	X	X	X
Field and Internal (Laboratory) COC Records	X	X	X
Sample Receipt Documentation Log	X	X	X
Project Correspondence	X	X	X
Target Compound Analytical Results Summary	X	X	X
TIC Analytical Results Summary	X[A]	N/A	X[A]
Surrogate %R Summary	2	2	2
MS/MSD Summary	2	2	2
LCS/LCSD Summary	2	2	2
Method Blank Summary	2	2	2
GC/MS Tuning and Mass Calibration Summary	2B	N/A	2B
Initial Calibration Summary	2B	2B	2B
ICV Summary	2B	2B	2B
Continuing Calibration Summary	2B	2B	2B
IS Area and Retention Time Summary	2B	2B[A]	2B
Sample Raw Data	4	4	4
Standards Raw Data	4	4	4
Raw QC Data	4	4	4
Extraction Logs	4	4	4

Notes:

X Required Element for all deliverables Levels
N/A Not Applicable to the analysis
2 Required Additional Element for Level 2 Deliverables (in addition to elements required for all deliverables Levels)
2B Required Additional Element for Level 3 Deliverables (in addition to elements required for all deliverables Levels and additional elements for Level 2 deliverables)
4 Required Additional Element for Level 4 Deliverables (in addition to elements required for all deliverables Levels and additional elements for Level 2 and Level 3 deliverables)
[A] Required Element for associated deliverable Level when applicable to the analyses performed

2 Inorganic and Wet Chemistry Deliverables Requirements

In the event that certain required information is not included on a particular form, the laboratory shall provide additional documentation (*e.g.,* preparation logs or analytical runlogs) to ensure that the minimum required level of documentation is supplied.

2.1 Target Analyte Results Summaries

Target analyte results summaries are required for all MS/MSD samples, laboratory duplicate samples, LCS/LCSDs, and preparation blanks and will be arranged in increasing alphanumeric order by laboratory sample number.

The target analyte results summary must include:

- SDG number
- NORFOLK SOUTHERN sample number
- laboratory sample identifier
- matrix of the NORFOLK SOUTHERN sample
- date of sample collection
- sample percent solids (if applicable)
- name and CAS number for each target analyte
- concentration or project-required detection limit (PRDL) or MDL for each target analyte
- any applicable flags for target analyte results (*e.g.,* “U” to designate a “not-detected” result)
- concentration units

2.2 ICV and CCV Summary

The ICV and CCV summaries will be arranged in chronological order, by instrument and must include:

- SDG number
- names for all target analytes
- instrument identifier
- start and end dates and times of the analytical sequence
- true concentrations and concentration units for all target analytes for the ICV and CCV standards
- observed concentrations and concentration units for all target analytes for each ICV and CCV analysis
- calculated %R for all target analytes for each ICV and CCV analysis
- control limits for ICV and CCV

2.4 ICB and CCB Summary

The ICB and CCB summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- names for all target analytes

- instrument identifier
- start and end dates and times of the analytical sequence
- observed concentration or PRDL and concentration units for each target analyte for each ICB or CCB analysis
- acceptance criteria for ICB and CCB analyses

2.5 Preparation Blank Analytical Summary

The preparation blank analytical summaries will be arranged in chronological order, by instrument and must include:

- SDG number
- preparation blank sample identifier
- names for all target analytes
- instrument identifier
- observed concentration or PRDL and concentration units for each target analyte
- acceptance criteria

2.7 MS/MSD Sample Summary

The MS/MSD sample summaries will be arranged in alphanumeric order by laboratory sample number and must include:

- SDG number
- NORFOLK SOUTHERN sample number of the non-spiked aliquot
- percent solids for the NORFOLK SOUTHERN sample (if applicable)
- analysis file numbers for the MS/MSD analyses
- names of the target analytes included in the spike solution
- true concentrations and concentration units for each analyte in the MS/MSD
- observed analyte concentration and concentration units in the non-spiked aliquot
- observed analyte concentration and concentration units in the for each analyte in the MS/MSD
- %R for each analyte in the MS/MSD
- recovery limits for each analyte
- RPD between the MS/MSD results
- RPD limit for each compound

2.9 Laboratory Duplicate Precision Summary

The laboratory duplicate precision summaries will be arranged in alphanumerical order by NORFOLK SOUTHERN sample number and must include:

- SDG number
- NORFOLK SOUTHERN sample number for the duplicate sample
- percent solids for the NORFOLK SOUTHERN sample (if applicable)
- names for all target analytes
- analyte concentration and concentration units observed in the original sample

aliquot
- observed analyte concentration and concentration units in the duplicate sample analysis
- calculated RPD for all target analytes
- control limits for RPD

2.10 LCS/LCSD Recovery Summary

The LCS/LCSD recovery summaries will be arranged in chronological order, by instrument and must include:

- SDG number
- LCS/LCSD identification number
- names for all target analytes
- true concentration and concentration units for all target analytes in the LCS/LCSD solution
- observed concentration and concentration units for all target analytes in the LCS/LCSD analysis
- calculated %R for all target analytes
- control limits for LCS/LCSD
- RPD between LCS/LCSD results
- RPD limit for each analyte

2.13 PRDL and MDL Summary

The PRDL and MDL summaries will be arranged in chronological order, by instrument and must include:

- SDG number
- instrument identifier
- date the MDL determination was performed
- names for all target analytes
- determined MDL for all target analytes
- PRDL for all target analytes
- concentration units

2.16 Preparation Logs

- TCLP or SPLP Preparation Logs (if TCLP or SPLP extraction was performed)
- NORFOLK SOUTHERN sample and QC sample digestion logs, including calibration preparation logs (if applicable)

2.17 Analytical Sequence Form

The analytical sequence forms will be arranged in chronological order, by analyte, by instrument and must include:

- SDG number
- instrument identifier

- NORFOLK SOUTHERN sample numbers associated with the sequence
- QC sample identifiers associated with the sequence
- analysis date and time for each NORFOLK SOUTHERN sample and QC sample associated with the sequence

2.20 Raw Data for Wet Chemistry Parameters

- For each reported value, the laboratory will provide all raw data (instrument printouts or logbook pages) used to obtain that value. This requirement applies to all required QA/QC measurements and instrument standardization, as well as all sample analysis results. Raw data must contain all instrument readouts/logbooks pages used for the sample results. Each exposure or instrumental reading must be provided, including those readouts/logbook pages that may fall below the quantitation limit. A photocopy of the instrument's direct sequential readout must be included if the instrumentation has the capability.
- Wet Chemistry Preparation Logs (by parameter)

Table 2: Required Deliverables Wet Chemistry Analyses

	Wet Chemistry Parameters
Cover Letter/Letter of Transmittal	X
Case Narrative	X
Field and Internal (Laboratory) COC Records	X
Sample Receipt Documentation Log	X
Project Correspondence	X
Target Analyte Results Summary	X
Initial Calibration Summary	2B
ICV/CCV Summary	2B
ICB/CCB Summary	2B[A]
Preparation Blank Summary	2
MS/MSD Summary	2[A]
Duplicate Precision Summary	2
LCS/LCSD Recovery Summary	2
PRDL and MDL Summary	2B[A]
Wet Chemistry Preparation Logs	2B
Analytical Sequence Form	2B
Raw Data	4

Notes:

X Required Element for all deliverables Levels

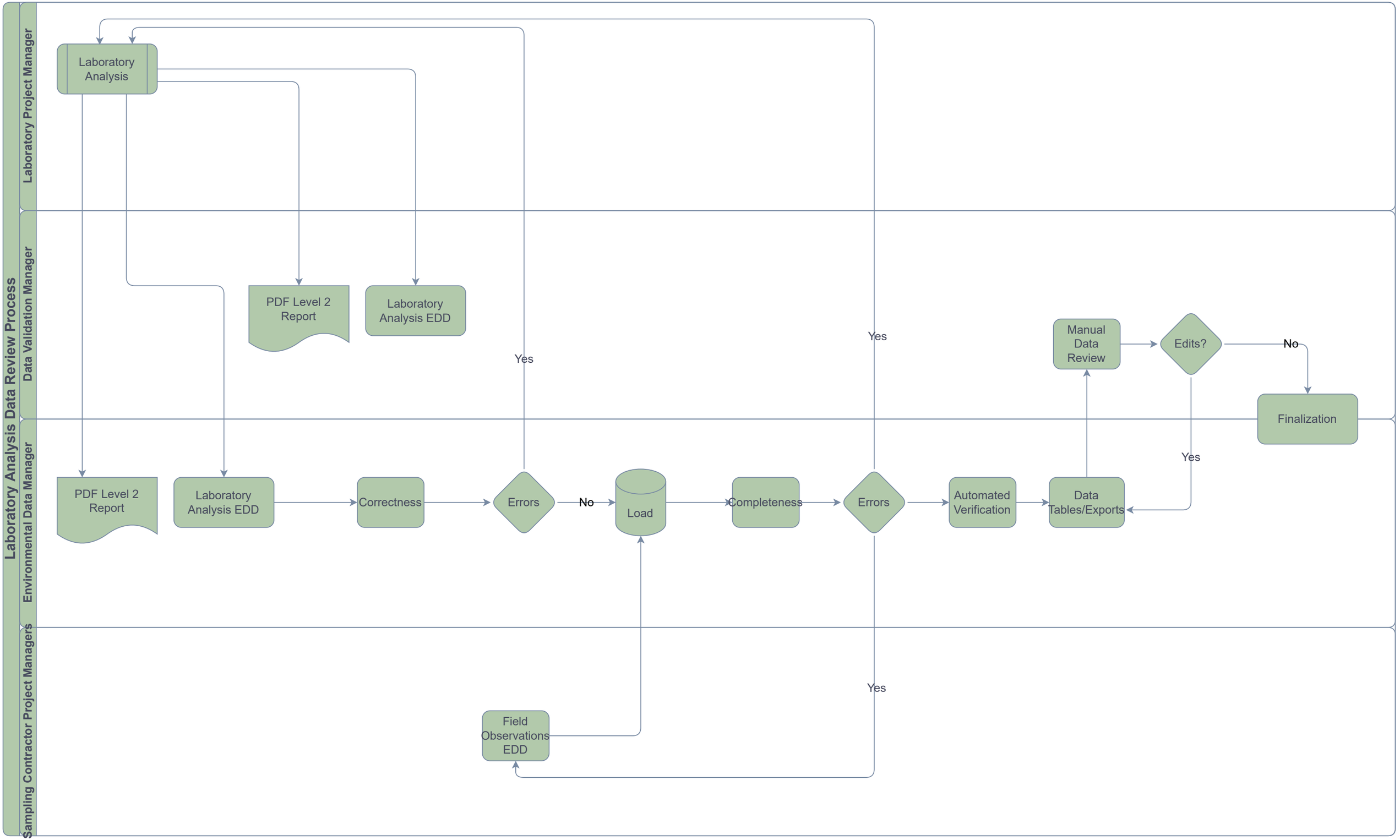
2 Required Additional Element for Level 2 Deliverables (in addition to elements required for all deliverables Levels)

2B Required Additional Element for Level 3 Deliverables (in addition to elements required for all deliverables Levels and additional elements for Level 2 deliverables)

4 Required Additional Element for Level 4 Deliverables (in addition to elements required for all deliverables Levels and additional elements for Level 2 and Level 3 deliverables)

[A] Required Element for associated deliverable Level when applicable to the analyses performed

Appendix I – Laboratory Analysis Data Review Workflow


Laboratory Analysis Data Review Process
Laboratory Project Manager
Laboratory Analysis
PDF Level 2 Report
Laboratory Analysis EDD
Yes
Yes
Manual Data Review
Edits?
No
Finalization
Yes
Data Tables/Exports
Automated Verification
Errors
Completeness
Errors
No
Load
Correctness
Laboratory Analysis EDD
PDF Level 2 Report
Environmental Data Manager
Sampling Contractor Project Managers
Yes
Field Observations EDD

Appendix J – Authorized Users

Norfolk Southern Authorized Users

Organization Affiliation	Project Role	Project Contact	Contact Information	Allowable Data Access
example:				
Environmental Standards	*Environmenta*	*Stephanie Lein*	*slein@envstd.com*	*NS Data Portal* *EPA R5 - Upload Only*

Appendix K – Data Change Request Form

Data Change Request Form

Norfolk Southern
East Palestine, OH Derailment

March 21, 2023

Data Change Request Form

The Data Change Request Form will serve to document the data request and timetable for delivery.

Steps:

- Fill out Data Change Request Form and associated files to further explain the request.
- Attach the form and associated files in an e-mail to the appropriate Project Manager (Laboratory, Sampling Contractor, Environmental Data, QA, or Field Oversight)
- The subject of the e-mail should be- "**Data Change Request [Date].**"
- The Project Manager will be in contact to confirm information and delivery date.

Request Case:

1. Data do not match source documents
2. Source Documents Incorrect
3. Modification to data and/or the functionality of data storage system is required

Requestor Information		Project Manager use:
Request Type: 1 2 3 (See Above)		
Date:		
Proposed Completion Date:		
Name:		
Company:	Phone:	
E-mail:		
Description of Request: (Below) File Attached? Y N		
Summary: Proposed Solution:		Date Completed:

Project Manager

Signature _____ **Date:** _____

Data Requestor

Signature _____ **Date:** _____

Stakeholders to Notify:

Appendix L – Norfolk Southern Data Portal

DATA PORTAL

EAST PALESTINE, OH DERAILMENT

February 11, 2023

by Nathan Schaaf

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DATA PORTAL

East Palestine, OH Derailment

General Information

Purpose

The purpose of this document is to provide guidance in establishing a SharePoint site for collaboration among stakeholders of the 2023-02-03 East Palestine, OH Derailment (ID # 152207). A Task Force has been stood up to build a data portal for storage of Work Plans and figures, tables, and laboratory data for surface water, potable water, and air sampling results. This will allow Task Forces to upload and regulators to download documents and data directly. This will replace the current process of emailing this data to the Incident Commander and relying on the agency to distribute data.

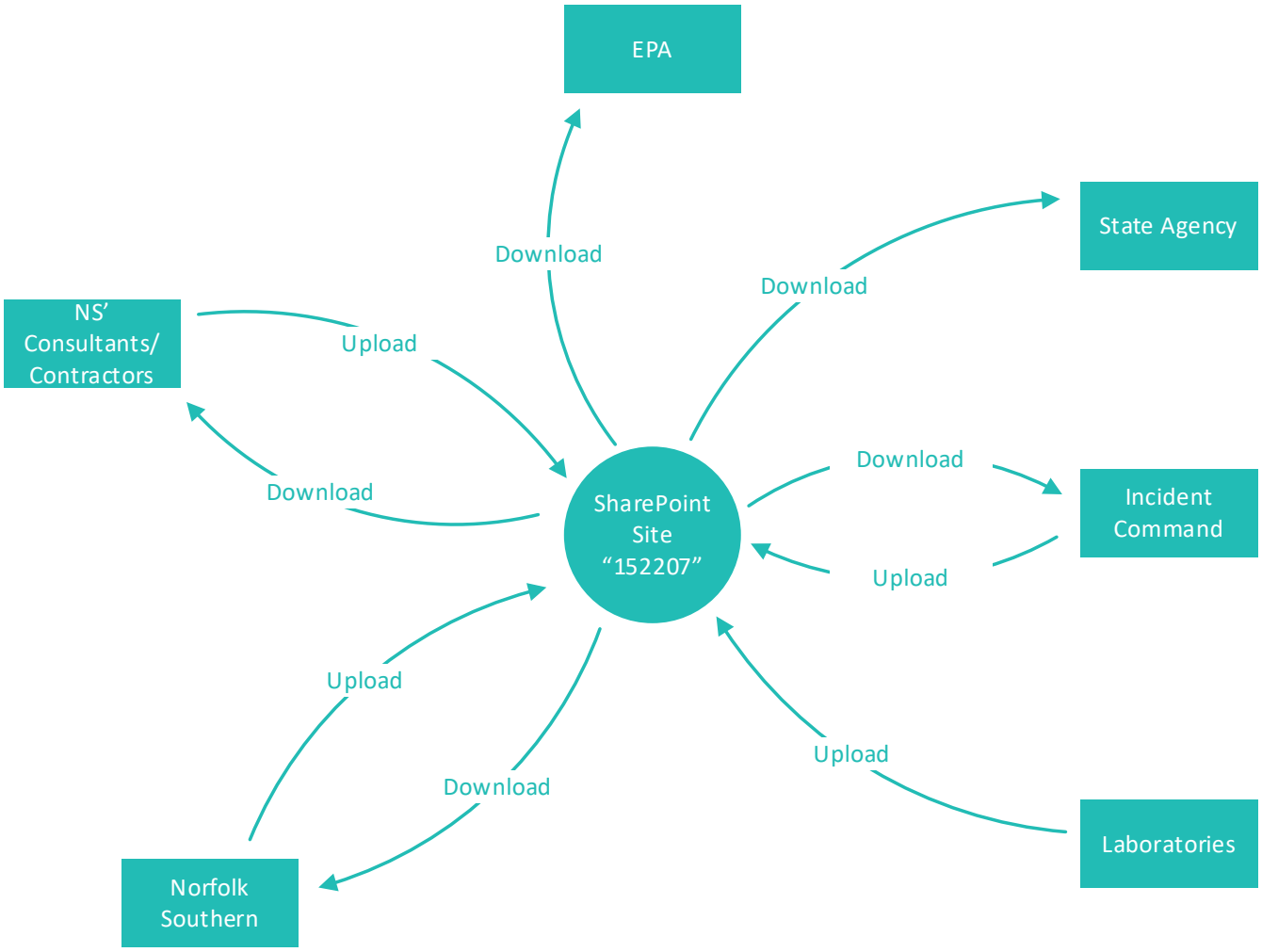
Objective

A SharePoint Online Site will be used to provide a secure place to store, organize, share, and access information. The site can be accessed through any web browser, but for the best user experience Microsoft Edge is recommend. Since the sight is cloud based, the SharePoint Mobile App can be used to access the site on any iOS or Android mobile device. And since SharePoint is a Microsoft product, it integrates well with the entire Microsoft 365 Suite of products, such as Teams, Word, Excel, Power Apps, Power Automate, etc.

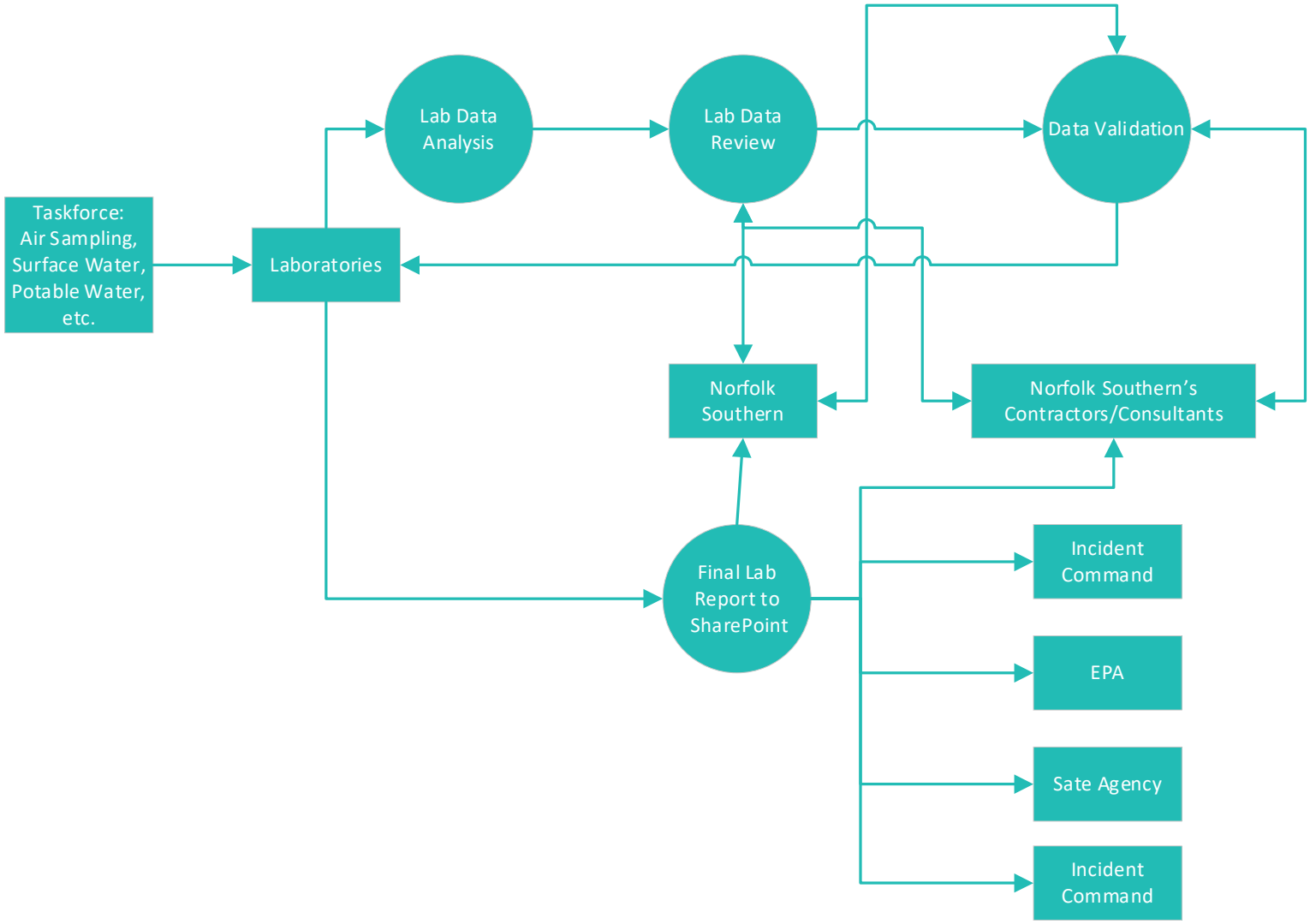
Key Items

- Document Nomenclature and OCR
- Site Permissions – Approved Organizations Table
- Site Permissions – Access Requests

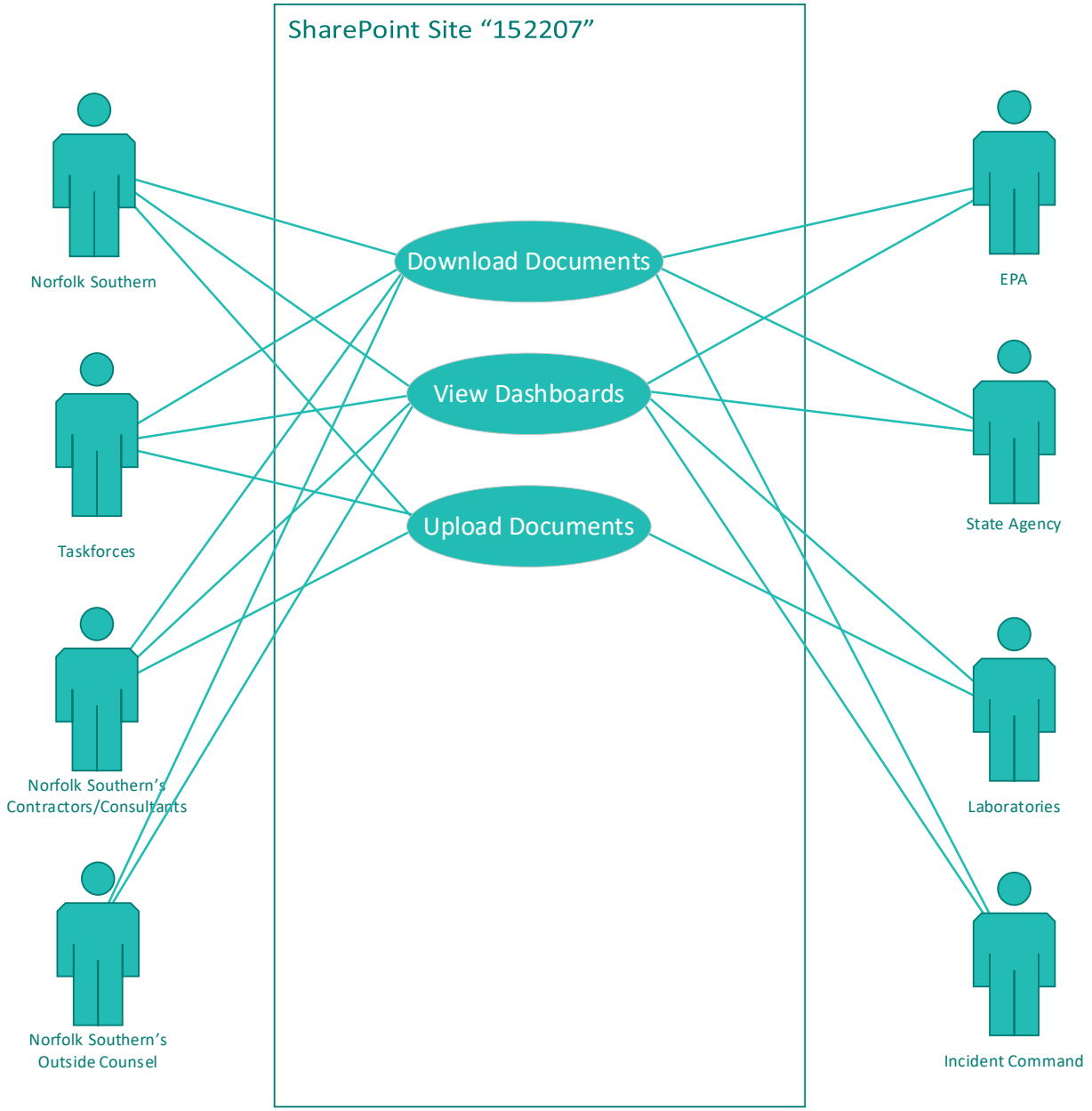
Context Diagram



Data Flow Diagram



Use Case Diagram



Site Structure

Document Libraries will be used to store files, such as PDF, XLSX, TXT, DOCX, EDD, etc. Each library created should contain one subject of documents that relates to a records classification [reference Records Classification]. For example, separate libraries should be created for “Potable Water Sampling” and “Air Sampling” documents, even though they are both EHS130 records.

Lists can be used to store data sets for analysis, download, dashboard graphic displays, though nothing of such use is planned at this time.

Pages are used to display and organize information, such as a dashboard, graphic, instructions, welcome message, etc.

Libraries and Lists

Library and List creation should use single strings of words or abbreviations in order to keep a repository URL short and simple. For example, create a library called “WorkPlan”, then change the name to “Work Plans” for ease of understanding.

Each library should also include a description of what it includes, preceded by the document security identification, and concluded with the Norfolk Southern records class. For example:

> *[Public] This library contains Surface Water Sampling Results. [EHS190]*

Metadata fields should be used primarily for Library organization and structure, and the use of subfolder structure should be limited.

Initial Libraries

- Air Sampling
- Correspondence
- Meeting Information
- Potable Water Sampling
- Site Guidance
- Soil and Ground Water Sampling
- Surface Water Sampling
- Waste Sampling
- Work Plans

Initial Lists

- Constituents
- Site and Information Contacts

Document Nomenclature and OCR

Document nomenclature should follow this standard format

> *Location – Description – Date*

The *location* should reference a specific site, location, or the general incident location. The location can be excluded if it doesn’t apply as a descriptor to the information in the document. The *description* should

be no more than 5 words or commonly used abbreviations. The *date* should be in the format of YYYY_MM_DD. The date can be excluded in the name of documents that are routinely updated, such as evergreen documents or spreadsheets.

Examples:

- Taggart Road Incident – Preliminary Surface Water Sampling Results – 2023_02_06.pdf
- Village of East Palestine – Laboratory Data Tracking Spreadsheet.xlsx

All PDF documents must be saved in an ***Optical Character Recognition (OCR)*** format.

Security

Document Security

The Information Security Policy & Process Documents (ISPPD) for Norfolk Southern defines guidelines to protect all information technology assets used by Norfolk Southern. The ST.009 Data Classification Standard contains a glossary of terms, and these terms can be used to categorize security for electronic documents and data.

For use of this SharePoint site, all documents should be considered ***Public*** unless otherwise directed by Norfolk Southern.

- ***Public***

  This classification applies to information openly accessible to all parties. Disclosure of public information should have no bearing on any Norfolk Southern business operations or those of its clients, partners and vendors.

- ***Internal***

  This classification applies to widely distributed information resulting in a minimal level of risk to NS, its personnel and/or business partners, if released improperly. Such information is widely available due to business requirements, however distribution outside of Norfolk Southern is generally discouraged.

- ***Confidential***

  This classification applies to information resulting in a moderate level of risk to NS, its personnel and/or business partners if released improperly. Such information is distributed only on a need-to-know basis. Personally Identifiable Information (PII) stored, processed, or transmitted by NS (excluding storing and handling of one's own PII) is confidential information requires special handling. Additional examples of CONFIDENTIAL information are rate contracts, [business] recovery plans, certain engineering diagrams, and any information disclosed by another party to NS included in a confidentiality or non-disclosure agreement.

- ***Restricted***

  This classification applies to information resulting in a significant level of risk to NS, its personnel and/or business partners if released improperly. Information of this type can cause substantial business, legal or regulatory harm to Norfolk Southern. Such information is released ONLY to specific individuals. The distribution of such information requires specific authorization from management at the appropriate level of responsibility and extreme care is used in the transmission and retention of such information. Examples of RESTRICTED information are: financial reporting data prior to public release, information regarding merger or acquisition transactions under negotiation.

Site Permissions

The SharePoint Site permissions should be managed at the site level and, if possible, avoid managing permissions at a Library or List level. No unique permissions should be allocated below a Library or List level (aka subfolder or document level).

Security groups should be created for each organization's access to the site, and an individual's permissions should only be allocated through their group's permissions. The only exception to this standard are the *Site Owners*.

Example:

- Norfolk Southern [Edit]
  - Person 1
  - Person 2
- Owner [Full Control]
  - Person 1
  - Person 2
- AECOM [Edit]
  - Person 1
  - Person 2
- OH EPA [Read]
  - Person 1
  - Person 2

Each person accessing the site should have their own, individual email account to gain access. No group email accounts should be used for site access.

A person does not need to have a paid Microsoft account to access the site if invited or granted permissions. If their email is not linked to a Microsoft account, then they can follow the invite prompts to create a free account and participate on the site.

Note: Since the invite to a SharePoint site originates from Microsoft, a recipient will often need to check their *spam* or *junk* folder in their email to receive the invite.

This table contains a list of all the Norfolk Southern approved organizations to access this site. Any person employed by one of these organization, and has a reasonable reason for access, can be granted access to the site.

Individuals can be automatically vetted and approved by a valid organization email address (e.g., @nscorp.com, @aecom.com, @epa.gov, etc.), otherwise verification of the individual should be made by other means.

This table should be kept up to date by the *Site Owner* who allocates permissions. Additional organizations added to this table must be approved by either Nathan Schaaf, Manager Safety & Environmental Systems & Projects for Norfolk Southern or the acting Incident Commander.

Approved Organizations Table

Organization	*Permissions Level*
Site Owner [AECOM & Norfolk Southern]	Full Control
AECOM	Contribute
ARCADIS	Contribute
CDC ATSRD	Read
Columbiana Health	Read
CTEH	Contribute
Environmental Standards	Contribute
EnviroScience	Contribute
Tetra Tech	Contribute
Troutman Law	Contribute
OH EPA	Read
OH Dept. of Health (ODH)	Read
Miller Environmental	Contribute
Norfolk Southern	Contribute
Pace Laboratories	Contribute
PA DEP	Read
PA DOH	Read
SPSI	Contribute
StanTech	Contribute
US EPA	Read
US Fish & Wildlife Service (US FWS)	Read
Wilmerhale Law	Read

Access Requests

Access request to the site can be made to:

- Nathan Schaaf | nathan.schaaf@nscorp.com | 470-585-8211

Records Classification

- ***Site Remediation [EHS190]***

  Records related to the contamination of property by the company or on property acquired by the company, the clean-up efforts implemented, and any investigation and/or litigation related to such occurrences. Includes environmental testing records, incident investigations and reports, and site remediation records.

  Examples:

  - Correspondence
  - Environmental Testing Records
  - Facility Drawings
  - Fish and Fish Habitat Studies
  - Hazardous Substance Release Litigation Records
  - Historical Aerial Photos
  - Historical Photos
  - Incident Investigations
  - Incident Reports
  - Site Assessment Reports
  - Site Remediation Records
  - Waste Water Reports
  - Waste Water Studies

- ***Environmental Testing and Monitoring [EHS130]***

  Records related to the environmental testing, monitoring, and assessment of property and the environmental impact resulting from company actions not covered elsewhere. Includes environmental testing, hazardous waste tests, and water quality testing. Also includes records related to an environmental spill incident at the company, such as spill reports, documentation, and cleanup and disposal details. Does not include site remediation.

  Examples:

  - Air Quality Test Records
  - Cleanup Details
  - Disposal Details
  - Environmental Test Records
  - Ground Water Test Records

- Hazardous Waste Materials Test Records
- Site Assessment Records
- Soil Site Assessments
- Soil Test Records
- Solid Waste Monitoring Records
- Surface Water Site Assessments
- Surface Water Test Records

- ***Waste Disposal [EHS200]***

  Records related to the treatment and disposal of hazardous waste. Includes approved waste disposal facilities lists and waste profiles.

  Examples:

  - Approved Waste Disposal Facilities Lists
  - Hazardous Waste Manifests
  - Waste Disposal Lab Test Results
  - Waste Disposal Reports
  - Waste Profiles

- ***Application Documentation [ISY100]***

  Records documenting the development of new functionality and architecture for computer systems and applications. Includes change management, requirements documents, and scope documents. Also includes records related to source code for software that is either internally or externally developed and used internally by employees.

  Examples:

  - Site Guidance

- ***Project Management [ADM130]***

  Records related to the management of internal solutions projects, special studies, analyses, and other departmental events not covered elsewhere. Includes ad hoc studies performed at the corporate or work group level. Also includes project notes, presentations, special studies, project plans, and meeting minutes. Does not include projects related to legal matters.

  Examples:

  - Meeting Information
  - Meeting Records
  - Meeting Attendance Tracking